

शौर्यमाशुक्रिया तीक्ष्णं शस्त्रमस्वेदवेपथुः ।
असंमोहश्च वैद्यस्य शस्त्रकर्मणि शस्यते ॥

—वाग्भट

Courage, quick action, sharp instruments,
absence of perspiration, absence of trembling
and a clear intellect—these are qualities
which are praiseworthy in a Surgeon

—Vagbhat

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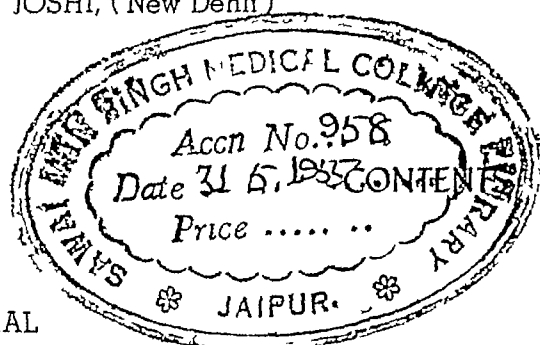
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EDITORIAL

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Indian Journal of Surgery

Vol. I]

MARCH 1939.

[No. I

EDITORIAL

There are already numerous superb Journals of Surgery which record the splendid original work and thought in various countries. In publishing "The Indian Journal of Surgery" as an organ of the Association of Surgeons of India, it is not as if India were overloaded with the original work her surgeons had done or overwhelmed by their original thought.

The Medical profession in India--and by that we mean the Indian Medical Practitioners--has been completely under the thumb of the Indian Medical Service until quite recently and even now it is not completely emancipated. The Indian Medical Service has done much research work and much original work but that does not mean that the Indian practitioner is incapable of either. We are prepared, nay we are eager, to acclaim any member of the Service who shows merit in his work, be it administrative or scientific, but we are not prepared to accept as supermen, any member of the Service just because he is a member of that Service. The Indian practitioner has never had the opportunities nor the facilities. Even today when the hold of the Indian Medical Service has relaxed a little, all the Research Institutions are controlled by the Officers of the Service and except in the case of Calcutta & Bombay, the Research Institutes are far away from the teaching centres. The Medical profession in India must agitate to have these Research Institu-

tes shifted to the teaching centres and to have them under their own control. It is no good, we firmly believe, to have these institutes merely in the same town, but they should be attached to the teaching colleges so that the coming generations of practitioners will be brought in close contact with men who carry on research work and thus be stimulated to follow in their foot steps. As things are to day research is detached from the ordinary ward and class work, and the imagination of the students of today--that is the practitioners of tomorrow--remains unstimulated, and they are apt to believe that thinking and practicing are two different things.

Another great handicap that exists to-day, which hinders medical progress in this country, is the record system in our hospitals. It is difficult to believe that the records in such an old institution as in J J Hospital, Bombay, were not even preserved for more than 3 years, and this not so very long ago! Then the period was extended to 5 years, and only recently it has been resolved to preserve them permanently. Hospitals in the Western countries devote much time and money on the records of old cases, sorting out and classifying them and making them immediately available by card-index and cross-index systems. They also give much time, labour and patience to the follow-up of cases. Unless all these are made available to the staff of a Hospital, serious work can-

not be done and comparisons cannot be made. It is our duty therefore to go on clamouring for these very necessary reforms, till the authorities in charge concede them to us.

The Association of Surgeons of India has as its main object the improvement and stimulation of Indian Surgery. The rules and regulations published at the end of this number, show its constitution as well. The thing that appeals to us most, and which more than anything else justifies the exi-

stence of the Association, is the regulation regarding the subjects for discussion at its annual meetings. It will be seen that it is proposed to name subjects 3 years ahead. Naturally this cannot be fulfilled for the first 2 years. The 3 years' time gives every opportunity to workers to observe and record cases pertaining to that subject over a sufficiently long period. We feel that this will add zest to observations and in that way will certainly benefit Indian Surgery. It may be noted here that the following subjects have been proposed and accepted for the next 3 years.

DECEMBER 1939

Subject

- 1 Peptic Ulcers in South India
- 2 Thrombo-angiitis Obliterans
- 3 Pyogenic Infection in Diabetes
- 4 Treatment of Inguinal Hernia

Discussion to be opened by

- Mr C. P. V. Menon (Madras)
 Mr R. N. Cooper (Bombay)
 Mr M. D. Patel (Ahmedabad)
 Mr S. R. Moolgavkar (Bombay)

1940

- 1 Treatment of acute appendicitis
- 2 Injuries of the Elbow Joint
- 3 Treatment of Empyema Thoracis
- 4 Surgery of the Knee Joint

- Mr V. L. Parmar (Bombay)
 Mr M. G. Kini (Vizagapattam)
 Mr M. M. Pandya (Bombay)
 Mr M. C. Condillac (Trichinopoly)

1941

- 1 Surgical Aspects of Filariasis
- 2 Surgical treatment of Pulmonary Tuberculosis
- 3 Laryngeal Carcinoma
- 4 Injuries of the Thorax

Mr U. P. Sinha (Patna)

- Mr V. R. Sanzgiri (Bombay)
 Mr S. J. Gandhi, }
 Mr S. G. Joshi } (Bombay)
 Mr C. S. Patel (Bombay)

It is our desire to record the original work done and observations made by the Surgeons of India. Indian Surgery is still in its infancy and as has been pointed out above has not as yet been fully nourished on the milk of research. We wish to give publicity to the work of Indian Surgeons and we want them to send us their records and observations even though they may feel diffident about them. It is by cultivating this habit of recording and publishing our

results that we shall improve and thus attain that standard--we hope not in the very distant future--when the Indian Journal of Surgery will be a work of reference.

We must here record our indebtedness to Mr R. N. Cooper, Lt Col Pandala & Mr C. P. V. Menon for the trouble they have taken & the time & money they have spent to make the inaugural meeting of the Association a success, without which this Journal would not have been in existence.

ASSOCIATION OF SURGEONS OF INDIA INAUGURAL CONFERENCE

22nd Oct 1938

Address by Mr S B Gadgil, F R C S, Chairman, Reception Committee

On behalf of the Surgical fraternity of Bombay I have the honour and privilege to welcome you all, who have assembled here to-day for the inauguration of the all India Surgical Conference

The Association of the Surgeons of India is going to have its birth in this great city of ours. The Surgeons assembled here on this occasion are going to have the honour of being the official accoucheurs of this association. I must here specially mention the name of Lt Col Pandalarai whom we intend to elect the first President of the association of Surgeons & who has taken an important part in bringing about this gathering.

I have every wish that this Association should attain a position among the foremost surgical bodies of this ever contracting world, contracting on account of the facilities we have to exchange our ideas in a very short time.

It is the intention of the conveners of this association to offer the devotees of Surgery in this country an outlet for their productions and it is hoped that some of these will find an enduring place in the field of surgical literature. No doubt there have been many opportunities to the Surgeons of this country to do original work, but without such conferences it is impossible to have this work criticised and its intrinsic value determined.

In starting this Association, we hope its face is set in the right direction and its eyes are fixed upon a rising and not on a setting sun.

We also hope that this Association will form a nucleus round which votaries of the surgical world will gather, exchange ideas and enhance the reputation of this country by some important surgical work.

We reach out our hands and invite into our circle all ladies and gentlemen, whose work entitles them to call themselves Surgeons.

It has been well said that there is no thinker so profound but that he can reach depth through the stimulus of other minds, no genius so luminous but that it can gather new radiance by borrowing new gems of thoughts and ideas. No doubt we can communicate with each other by articles in Journals but there is no better means of communication than for the thinkers to come in close personal contact and communion. In so doing we see, hear, feel and live with the lecturer, grasp his thoughts and enthusiasm which we hardly do by reading his lecture.

Besides this interchange of minds, thoughts and aspirations it also brings, this divided country and its people together. We will all feel the same pride for any good work done in any part of this country by a member of our Association as if it were done by ourselves.

Ladies and Gentlemen, I welcome you all, you who have taken the trouble to come, some of you, from very long distances. The working committee in Bombay feels very proud of the response that it has got at its first meeting from the Surgical fraternity of India.

The reception committee is also under a deep sense of obligation to Dr J N Mehta.

We need enthusiasm, no, not at the beginning but during its continuation, for at least four or five years, not at its birth but during its infancy till it reaches an adult age.

I also welcome on behalf of the working committee our beloved Honorable Minister of Health, Dr Gilder, for having graced this occasion by his presence to officially open this conference.

Ladies and Gentlemen, I have the honour to propose Lt-Col Pandalarai to the Chair, to be our guide in conducting this conference.

PRESIDENTIAL ADDRESS

President Lt-Col G. Pandarai I.M.S., F.R.C.S

Hon'ble Dr Gilder, Ladies and Gentlemen,

I am unable to express in adequate terms the pleasure and honour I feel in being asked to preside on this occasion. You are aware how this session has been a long awaited event. Many Surgeons in this country have written during the past few months and stated how they have been longing for an Association like this and wondering why it did not come into being before. Actually the general desire to bring about this Association found strong expression on the occasion of the All India Medical Conference which met at Madras in December 1937. A proposal was then made and was endorsed by everyone who heard of it. Two of us from Madras were accordingly authorised to take steps to bring about this meeting. From the replies received from all parts of India in the course of our work we felt greatly encouraged. We selected Bombay as the most central place for a first venture of the kind and Mr Cooper very kindly accepted the onerous duties of making the local arrangements. We have been also most fortunate in getting Dr Gilder, the Minister of Public Health in this Presidency to inaugurate our Association to day. Himself a Surgeon and a man of great experience and mature wisdom, a more suitable person to initiate our proceedings could not have been found. On your behalf I should like to thank him for so kindly coming here to day and guiding our deliberations.

I may be permitted to say that this new Association should not be considered as just one more added to the already existing large number of Medical Associations in this country. Our Association stands in the same position as the corresponding British Association for British Isles, Australian Association for Australia and Canadian for

Canada. By the step we are taking to-day we are taking our place alongside the large colonial organizations which I have just mentioned and I mention this for it has been asked why we should have a separate organization of this kind and why we should not exist as a Branch of the older Association in England. The answer is as I have stated above, that we consider ourselves as large and as important a geographical area as the other British Territories. It is only natural that as the children of a family grow up, they should also desire to set up their own families and carry on the tradition that has been handed down to them.

The purpose of our Association is to unify and bring into a single fold all those, irrespective of race or class, who practise surgery in this country. In this scheme of ours, we include also those who work within the limits of Indian States, nor do we exclude practitioners belonging to foreign countries who have chosen India as their home. We extend to one and all our hand of friendship and invite them to join us in strengthening the Association of Surgeons of India. In our work we are moved by one sentiment only, and that is the patriotic one of elevating the science and art of Surgery in India to the highest possible level and thus keep pace with the great Renaissance movement going on in India to-day. We have come to realise that if this country, as a separate entity, is to take its rightful place among the nations, we should march alongside them in every field of human activity and in achieving our aims we require the combined strength of all those Surgeons who wish well of this country.

It has been said that the art we practise is an imported one and has come from the West, that all of us who practise it now have been trained in the West or by

those who have been trained in the West and that we speak and learn the art in a foreign tongue, that therefore, our art is not of the soil and has not developed deep roots in our country. This is only a partial truth for regarding the art itself it is not admitted that we never had a past, may be a distant past. Our ancestors practised it with some success with the primitive equipment they possessed. We have to express our admiration for what they achieved in the circumstances in which they were placed. The greatness of Charak as a pioneer Surgeon of ancient India is an acknowledged fact and provides a background for our present and future activities. It may be interesting to know that recently while at New York, I came to know of the existence at the Academy of Medicine of a Club of select medical men named "Charak Club"—a great compliment to old India by the most progressive and energetic of modern nations! Unfortunately the foundations laid by Charak and his pupils were not built upon and for many centuries our ancestors lapsed into a state of self-sufficiency and introspection, this was again followed by long years of foreign domination with its attendant evils, the people steadily losing their power of initiative and creative thinking.

While in this state of generalised inertia and internecine feuds British occupation brought us into contact with Western science and we have to acknowledge the gift to this country of the benefits of modern surgery which have been introduced into India by our fore-runners in the Indian Medical and other Government Services, as well as a great number of Missionary medical men of all countries working in India. It is on this foundation of a recent nature that we have to build our future work. After all, modern surgery is of comparatively recent origin and dates from the discovery of antiseptics and the general adoption of

anaesthetics to allay the pain of operation. Modern surgical work as practised by the above categories of foreign medical men has its limitations and the field before us is vast, but we must acknowledge the great pioneer work they have already done. Many are the names of eminent Surgeons, of the Indian Medical Service or Missionary bodies who are held in great esteem in various parts of India and who have shed lustre on the name of India in the past. It will be invidious to mention names. Reputations built up by these and the famous institutions erected under their supervision should give us inspiration for our future work. These have led the way, now our time has come and we are called upon to take up the burden of medical and surgical service in this country.

Science and art have no national boundaries and we claim modern surgery as something that belongs to us by right as much as to any other country in the world. I do not think there is any inclination on the part of those, who are always thinking of our ancient glories and wish to see them restored, to reject modern surgery as something alien. While showing great admiration for the achievements of our ancestors, I find even among the practitioners of ancient medical systems, great eagerness to utilise the services of modern surgery whenever required. This is a happy sign indicating that the place of modern surgery in this country is assured.

Our Association has a mission and a policy. The mission is the advancement of surgery in India. Its policy is one of toleration and friendship to all. We have no politics except that we wish the name of our country to stand high among other nations. It may be that we will have on occasions to stand up for our country against others in our particular sphere of work. You must have noticed in medica

literature that in different countries the same procedure or disease or instrument is called by different names, each country calling it after a man of its own nationality. We may have to do this too without being accused of discourtesy to any other nation that may be on terms of cordiality with us. Otherwise this Association will adhere strictly to its field of scientific activities and as a part of its programme will work for improving facilities for specialisation and research in this country. We shall attempt to educate the public in measures for the saving of life and avoiding human waste. We shall work in the direction of promoting higher education of the medical profession by providing facilities for better post-graduate education. We propose to labour as one of the principal items in our programme for the creation of an Indian College of Surgeons to unify and enhance the prestige of the practitioners of our art. In a few years we hope to be in a position to supervise the higher surgical examinations in this country and take steps to further develop centres of higher surgical study which will attract surgeons from abroad just as we are attracted now, by foreign centres of learning.

In the near future we shall take steps to produce our own Surgical Journal to be a medium for the publication of the thoughts and ideas of the growing body of Indian Surgeons. Finally we shall encourage the active production in this country of all the requisites of modern surgery and thus enable us to become self contained in peace and war,

In other countries trades and professions of every kind are organizing with a view to protect their interests against outside attacks. In this country in the past we have suffered from lack of such organization. Society is rapidly organizing and unless we strengthen ourselves, organized

Society, i.e. Government which needs us as we need them, will so arrange matters that the medical profession including Surgeons will lose the important position which it now holds. It behoves us, therefore, to keep together in large and central associations of the kind we are establishing to-day, rather than in a number of scattered, local or sectional bodies, as then our weakness of opinion will be exploited against our interests.

It is thus clear that our Association has come in not a day too soon and we have a great deal to do. We, like all pioneers have to work with devotion and humility. It is gratifying that at the commencement we have the best wishes and blessings of the British Association of Surgeons whose President and Secretary have sent us a message of goodwill which runs as follows —

"The Association of Surgeons of Great Britain and Ireland learns with pleasure of the formation of a similar Association amongst the Surgeons of India, and desires to convey to this sister Association in the British Empire, all good wishes for its future success."

I had also lately the privilege of visiting the world-renowned Mayo Clinic at Rochester, Minnesota where I happened to mention to the Mayo Brothers that preparations were going on in India for the inauguration of an Association of Surgeons. They were good enough to ask me to convey to you their cordial greetings and best wishes for success in our venture.

Starting our work under these auspices with the world all round smiling on us and wishing us well, Ladies and Gentlemen, let us do our best for the honour of our Motherland.

ILEO-CÆCAL TUBERCULOSIS

Mr R N Cooper, M S, F R C S started the discussion on Ileo-Caecal Tuberculosis. He dealt with the History, Etiology, Pathology, Symptoms & Signs, Diagnosis & Prognosis. He said

At the very outset I thank my colleagues for having chosen me to introduce this discussion on Ileo-Caecal Tuberculosis. In doing so, I feel that I do no more than fulfill one of the precepts of Hippocrates that we should by precept, lecture and every other mode of instruction impart a knowledge of the healing art.

For an intelligent grasp of any medical subject it is essential to trace back the development of our available knowledge. It is in the light of the past that we begin to discern the coming shadows of the future.

Prof Elliot-Smith describes the existence of Pott's disease in an Egyptian Mummy of the 21st dynasty i.e. about 1000 B.C.

Hippocrates made an observation that a phthisical patient, when the hairs fall off dies if diarrhoea sets in. Ancient India made no contribution towards the knowledge of abdominal Tuberculosis. Diarrhoea and lumps in the abdomen are described but there is no reference to Tuberculosis nor any specific drug for this condition.

In western literature till about 1825 abdominal Tuberculosis with diarrhoea or dysentery was observed as a terminal symptom of pulmonary Tuberculosis.

Later more accurate descriptions are available with the inclusion of such complication as a perforation or a stricture. In 1845 Rokitsansky published his classical description of intestinal tuberculosis. This has formed the basis of all later observations and records. His descriptions are wonderfully accurate & embrace all manifestations—acute or chronic—and all such complications

as perforation, abscess formation, formation of internal and external fistulae.

No history of Tuberculosis can be complete without the honourable mention of Koch who discovered and identified the germ or the Bacillus of Tuberculosis on the evening of March 24th, 1882.

The scourge of Tuberculosis is not only of hoary antiquity but also of a wide and impartial distribution in the animal kingdom. We have thus the familiar Human, Bovine and Avian forms and the less familiar forms that attack the reptiles (reptilian) and the fish (piscine). The last two varieties do not attack the human race.

In the records of the Mayo Clinic 2 or 3 cases of the Avian type of tubercle bacillus affecting enlarged cervical glands have been mentioned. The role that Bovine Tubercle plays in the non-pulmonary forms of Tuberculosis varies in different parts of the world. In fact once Koch himself went as far as to state that the Bovine type was not pathogenic to man. The statistics from different parts of the world are interesting. In Scotland the incidence of the Bovine type producing non-pulmonary lesions is as high as 90%. In England it is 65%, in U.S.A. it is 54% and in Germany 25%. So far as India is concerned Bovine Tubercle plays a still smaller part. Dr. Soparkar's work at the Haffkine Institute, Bombay, is very illuminating. Dr. Soparkar writes in the Indian Journal of Medical Research 1929-30 that he studied 48 cases of enlarged Tuberculous glands (cervical & axillary) and 17 pulmonary lesions. In none of these could he isolate the Bovine strain. Later in the same article he mentions that in

one case of enlarged lymph glands he found a strain of Bovine Tubercle

It has always been presumed that Indian cattle are remarkably free from Tuberculous infection. There is a rude awakening therefore when one hears that the milch-cattle in a well-known local dairy showed a high percentage of Tuberculous infection.

It is next to impossible at this stage to give you an accurate idea of the prevalence of Intestinal Tuberculosis, far less of Ileo-Caecal Tuberculosis.

That tuberculosis plays havoc with the Indian population cannot be denied.

In Calcutta is established a voluntary service-The Bengal Anti-Tuberculosis Association. These workers state that about 100,000 die of Tuberculosis every year in Bengal. Assuming that for one death there are 10 cases, Bengal alone has one million persons infected.

In our own Province, the appeal issued on behalf of the King Emperor Anti-Tuberculosis Fund, states that 240,000 people in this Province are suffering from Tuberculosis and 24,000 die from it every year.

In our own city, the Administration Report of the Municipal Commissioner for 1936-37 states that the number of deaths from Tuberculosis was 1,993. Of these 1,738 were due to Pulmonary Tuberculosis and 255 due to other Tuberculous diseases. Realising the gravity of the situation and the scanty information that is available it is very satisfactory that a Tuberculosis Survey is to be undertaken, under the auspices of the Indian Research Fund Association. Amongst the objects of the survey are a study of the causal factors, the incidence of infection, the determination of the morbidity rate and the mortality rate etc. When these

figures are published we shall have a more authoritative statement available.

Still nearer home, as it were, I am able to obtain the figures at the K E M Hospital through the courtesy of the Professor of Pathology, Dr V R Khanolkar and the Associate Professor, Dr R Dhayagude.

Between 1926-1933, 2,000 autopsies were performed. Of these 216 cases showed Pulmonary Tuberculosis. Of these 216 cases, 80 showed Intestinal lesions. Thus nearly more than a third of the Phthisical patients had intestinal lesions. All these cases were of the Ulcero-Cavernous type. It is interesting to observe that in these autopsies not a single case of hyperplastic type of ileo-caecal tubercle was recorded.

This digression I presume, is pardonable. As we are a body of scientific workers our interest in this question must necessarily be larger than the mere detection of the disease and its treatment by the scalpel.

The first discussion on Ileo Caecal Tubercle was held in London in 1906 before the London Society of Medicine and was introduced by Hartmann.

Ileo Caecal tuberculosis is essentially a disease of the adult.

Looking at the records of the Bai Jerbai Wadia Hospital for children where the age limit of admission is 12 years, one finds that out of a total of 96 cases of abdominal tuberculosis admitted between 1930-37 only 3 cases were of intestinal Tuberculosis--the rest were cases of Tuberculous peritonitis.

At the K E M Hospital my friend Dr Dikshit, the Surgical Registrar has kindly obtained for me the following figures for the five years 1933-1937. Out of a total of 399 cases of abdominal Tuberculosis 164 were of Tubercular peritonitis, 136 of the small intestine and

99 were of Ileo Caecal tubercle. There is a slight preponderance of males over females so far as sex distribution is concerned (228 males—171 females). Out of the 399 cases a primary focus of Tubercle in the lungs or lymphatic nodes was discoverable clinically in 160 cases.

It is interesting to observe that the largest number of Tuberculous peritonitis occur between the ages of 10 and 20. The largest number of small bowel lesions occur between the ages of 20 and 40.

Hartmann in his discussion in London stated that Ileo Caecal tuberculosis was commonest between the ages of 20-40. This therefore corresponds to the figures obtained at the K E M Hospital. The youngest case recorded of this disease is 4 months.

CAUSE OF AGE INCIDENCE

The youngest age at which I have encountered this condition is 11 years.

To understand this peculiar age distribution it is essential for me to do a little side-tracking.

The work of Krause is of the utmost importance. When the Tubercle Bacillus enters a virgin soil (most often a child) the reaction set up differs from that in an individual who has already had a small dose of the infection and who acquired a kind of immunity or allergy.

In virgin soil the reaction is characterised by the fact that the tubercle bacilli when injected in any region do not produce a local destructive lesion but are quickly carried away by the lymph stream. Thus in a young child the tubercle bacilli, when ingested, penetrate the mucous membrane of the intestine without causing any demonstrable lesion in the mucosa. The bacilli pass through the submucous lymphatic tissue into the lymph nodes. If

the infection is heavy the child dies of the generalised disease. If the infection is mild the child survives and, acquires an immunity so that if at a later date a fresh infection occurs the response to this infection is of a different type. This response is known as the allergic phenomenon. The bacilli are held longer at the place of entrance and a destructive lesion follows, such as ulceration.

It seems to be a common belief that for a child the first infection occurs by way of ingestion. But the more accepted method of transportation of the Tubercle Bacilli is by inhalation.

Again it is believed that the consumptive coughs out the Bacilli in a fine-spray. Infection from this source is known as Droplet Infection. But more potent than this droplet infection is the inhalation of dust. But the dry city dust is not of great importance when it is remembered that bright sunlight like ours quickly kills the bacilli. The most common method therefore is the inhalation of dust from dried sputum deposited on handkerchieves, bed clothes or carpets.

Experimentally guinea-pigs are made to inhale dust laden with Tubercle Bacilli. The bacilli are found in the most distant or peripheral portion of the lungs of the guinea-pigs. Ghon, MacCallum and others have shown that the same thing happens in tuberculosis of lungs in children. There is always an extremely distant or peripheral primary lesion in the lung. This primary lesion or node may be represented in later years as a fibrous nodule or a scar. From this primary nodule the infection is carried to the tracheo-bronchial group of glands. These enlarge to a very great size.

These glands may caseate and burst into a bronchiole and carry infection widely. However, if the primary infection be not

severe the glands regress and the peripheral nodule becomes fibrotic. The system however has now acquired an immunity. Years may pass before a re-infection may occur. When however reinfection does occur the response is of the allergic type. The re-infection may come by ingestion or by the blood-stream. If by ingestion it may be from food or from swallowed sputum.

Animal experiments show that the simple presence of organisms is not enough. An associated catarrh or enteritis with some breach in the mucosa is a necessary factor. Such catarrh is often present in phthisical patients. Hence it is easy to see why the phthisical patient shows an infection of the alimentary tract in such a large percentage of cases.

Barium studies show that the Barium meal stays longest in the lower ileal coils. Tubercle Bacilli present in food or sputum would therefore come in contact with the mucosa for the longest time in these coils. Hence the commonest site for primary ulcerative lesion is in the lower end of the ileum.

From the point of view of Pathology two types of lesions are described

- (1) The Ulcerative (2) The hyperplastic

(1) This is by far the commonest type. The ulcers start in solitary lymph follicles or Payer's patches. The progress and the appearance of these ulcers are so well known to you that they need no description.

The complications that occur are

- (a) perforation with generalised peritonitis,
- (b) perforation with localised abscess,
- (c) perforation between two adherent coils producing an internal fistula. This is the nearest approach to a short circuiting operation by nature. Nature is a good

physician but a bad surgeon. The short circuiting is often inadequate.

- (d) perforation with the formation of an external fistula
- (e) an ulcer may form the starting point of an intussusception
- (f) The healing of ulcer results in cicatrization and stenosis and produces intestinal obstruction of varying grades
- (g) Two interesting cases of Atrophy of the large bowel in the course of a primary Tuberculosis of the small-bowel have been reported by Vedel and Baumel
- (h) A varying quantity of free fluid is found in the abdomen. This quantity is truly variable and offers some scope for further investigation from the point of view of prognosis.

The question of healing of a tuberculous ulcer has assumed a new importance because of the work of Gardner, Pathologist to the Trudeau Sanatorium, Saranac Lake, New York. A small series of cases were treated for varying periods by exposure to Quartz Mercury Vapour Lamp. In this series the healing was characterized by a slight formation of scar tissue, a definite epithelization, a complete disappearance of specific tubercles, lymphoid hyperplasia and formation of mamillations projecting from the mucous membrane.

There appears to be an inter-relation between pulmonary and intestinal tuberculosis. Tubercle Bacilli are always found in large numbers in the Thoracic duct of cases suffering from alimentary tuberculosis. The re-infection of the lung from this source via lymphatics or blood-stream is obvious. Again the marked improvement of the pulmonary condition

in some patients, that follows the proper treatment of the abdominal lesion indicates that a vicious circle can arise. This is a message of hope. Even in a phthisical patient the abdominal lesion must be submitted to proper treatment.

(2) THE SECOND VARIETY of Ileo-Caecal Tuberculosis is the Hyperplastic type. This is an uncommon lesion. In the last dozen years our Pathology Museum has captured only nine cases of Hyperplastic Tubercle. This hypertrophied form was first described by Hartmann and Pilliet in 1891 under the name of Tuberculous typhilitis simulating neoplasms. The pathological features are that the thickening is in the submucosa, the mucosa being thrown into folds or polypoid masses. Ulceration of the mucosa is in frequent

Caseation is absent. The hypertrophy is limited to the caecum, only exceptionally involving the ileum. Usually the extension is in a distal direction. Hartmann records a case where the process extended from the caecum to the ascending colon, and the hepatic flexure. Externally the caecum appears involved in a sclero-adipose mass. The involvement of the lymphatic glands is more voluminous than in Cancer.

Absence of induration is a feature of all tuberculous lesions. It is therefore interesting to speculate about this unusual hardness of a Tuberculous Caecum. I wish you to consider a possibility. Dr Anderson's and Dr Sabine's work on the Chemistry of Lipoids of the Tubercle Bacilli and the cellular reactions to the various fractions of the bacilli is very interesting. This work was carried out under the auspices of the Research Committee of the National Tuberculosis Association. To put it briefly the two important constituents of the Tubercle Bacilli are (1) Protein (2) Lipoid

Protein	Response on injection
	Plasma cell formation. It is also responsible for the cutaneous reactions.
Lipoids	
(a) Phosphatids	
Phthioic acid	Leads to Giant cell formation
(b) Acetone soluble fat	Leads to extremely varied cellular reaction
(c) Unsaponifiable wax	Leads to the formation of undifferentiated connective tissue cells
(A high hydroxy-acid which is acid fast)	

When the different components thus injected produce a separate reaction is it unlikely that the fibrosis produced is the result of the selective action of the unsaponifiable wax? The varying composition of the Bacilli may therefore be responsible for the varying reactions.

SYMPTOMATOLOGY

It is best to divide the patients into two groups. (a) Those with active pulmonary lesions where the abdominal symptoms appear as a complication and (b) those with prominent abdominal symptoms but with a latent or a quiescent Tuberculous focus elsewhere.

The first group can be disposed off very briefly. As early as 1810, G L Boyle the founder of correct teaching about Tuberculosis states in his "Reserche sur la phthisie pulmonair" that in 100 autopsied cases of phthisical patients 33 had healthy alimentary canals and 67 presented ulceration in the intestine. Our K E M figures already referred to show that out of 216 autopsied phthisical patients 80 showed intestinal lesion i.e. about 40%.

A very interesting and instructive work on Intestinal Tuberculosis (of secondary ulcerative type) was produced by Brown and Sampson of Trudeau Sanatorium, Saranac Lake, New York. In conjunction

with Gardner they have shown that definite benefit accrues to the pulmonary lesion as the result of treatment of the abdominal lesion. The treatment given essentially is prolonged exposures of the abdomen to Ultra-Violet rays. The pathological basis for such an improvement has already been referred to. Evidently this fact is not sufficiently recognised. This may account for my personal experience that not a single case with active pulmonary mischief has ever been referred to me for treatment of the abdominal condition.

The other group with prominent abdominal symptoms is the one that comes under the observation of the Surgeon. As already stated our records at the K E M show that out of 399 cases of such a nature, 160 cases had a demonstrable tuberculous lesion either in the lung or the lymphatic nodes. Even in such cases where such a lesion is not discovered clinically it must be assumed that a Ghon lesion must be present. I propose to divide these cases into a few definite types. This grouping has been suggested by personal experience.

(1) THE RAPIDLY ADVANCING TYPE

The patient is generally under 20 years of age. I shall describe a typical case. Three months ago there were no symptoms at all. Then vague pains started in the abdomen 1 to 1½ hours after meals. The pains lasted for a short time. For the last one month there was more continuous pain especially in the lower abdomen with an evening rise of temperature. A vague fullness of the abdomen is observed and the abdomen is tender more so in the right iliac fossa. No definite lump is palpable. On operation extensive tuberculous lesions are seen with adhesions between coils of intestine and the parietes. Nothing surgical can be done. For days following the operation the temperature remains normal. This is due to enforced rest. Once the patient stands up a

small evening rise of temperature is noticed, once again.

(2) THE TYPE WHICH SIMULATES ACUTE APPENDICITIS

I shall describe a typical case recently operated upon. A boy of eleven years of age used to have vague attacks of pain in the abdomen. One day the pain was severe and was felt in the right iliac fossa with a rise of temperature and vomiting. The family physician first observed some rigidity and later a lump in the right iliac fossa. At this stage I saw him. Naturally I diagnosed it as subacute appendicitis and put him on the Oschner—Sherren method of treatment. Signs and symptoms abated. He was to be operated after three weeks. However just one day previous to the day fixed for his operation he developed severe pains & vomiting. He was operated on at once. Acutely congested ileo-caecal region with evidence of tuberculosis was noticed. Along the ileum two more zones of tuberculous infection with acute congestion were observed. A short circuiting was done with a happy result.

It may be observed at this stage that the appendix loaded as it is with lymphoid follicles is never the primary seat of acute trouble of tuberculous origin. When it is involved it is as part of a lesion involving the ileum and the caecum. I should like to know your experience.

(3) THE TYPE THAT COMES AS AN ACUTE ABDOMEN

This occurs mostly in children. During biopsy one observes either an intussusception or a perforation. Barrington Ward in his book records two cases of intussusception in which the starting point was an ulcer in the ileum.

Perforation of a tuberculous ulcer has been recorded in children at ages of two and three years. Slesinger records a case in an infant 18 months old.

(4) THE TYPE WITH NO SET SYMPTOMS

This forms the commonest type. Two important features are that (a) symptoms have been present over a long period and the (b) symptoms have varied from time to time. A vague mass is often to be palpated in the right iliac fossa. A carefully elicited history reveals that the first deviation from the normal occurs in various ways. In quite a good few cases there is a history of so-called Typhoid or 'Paratyphoid' fever. In this country it is not unusual to label any prolonged fever as Typhoid. It is essential to recognise the existence of Tubercular Fever. Weeks or months after such a bout of fever I have noticed the development of typical Tuberculous Cervical Glands. It is therefore not at all surprising that months after such a bout of fever the patient complains of abdominal pain of a vague character very often unconnected with food or posture. More rarely the pain appears to have a definite relationship to food and cases have been diagnosed and treated as gastric or duodenal ulcers for years without success.

A case was operated for a supposed duodenal ulcer, and a gastro-enterostomy was done. Ten days later acute pain with vomiting developed. The abdomen was reopened. The anastomosis functioned properly but two strictures in the small intestine were noticed and dealt with by a lateral anastomosis proximal and distal to the lesions with success. It is essential to remark that this case was investigated in London and a Duodenal Ulcer was ruled out.

Other cases have just acute attacks of pain lasting for a few hours only. These attacks may come at long intervals. In most of these cases the lesion has been close to the ileo-caecal junction in the ileum but not at the junction.

Some of these cases have an appendix scar on the abdomen. I have been guilty of

this error. I removed an appendix years ago and reoperated to find the existence of tubercle. This mistake can be obviated by the golden rule of pulling out at least 6—10 inches of the ileum in every case of appendectomy and looking for abnormalities.

In many of these cases it is possible, by direct questioning, to elicit the history of rumbling noises in the abdomen. The noises are often accentuated during an attack of pain. In such cases, auscultation of the abdomen can easily detect these noises which are the result of exaggerated peristaltic movements. The sounds heard are much louder and more prolonged and more frequent than those met with in the normal abdomen. I plead for a systematic auscultation of the abdomen. I hope to put before you on some future occasion my personal observations on auscultation of the abdomen, acute and chronic. It is in this group of cases that a skiagraphic study is truly helpful.

In fact the symptoms of this group are so varied that I have taught my students for years that in all cases of unusual groupings of abdominal symptoms think of tubercle. A search should be made for the possible co-existence of another tuberculous lesion.

(5) THE TUMOR TYPE

This is the hyperplastic type with a definite tumour in the caecal region with signs of sub-acute obstruction.

A couple of general observations may be made as applicable to all the types. The pulse rate is generally high. Rapid loss of weight denotes an approaching end. A certain degree of anaemia is noticeable in Tuberculosis of the small intestine but not in Tuberculosis of the large intestine. This is of peculiar diagnostic importance when it is remembered that malignancy of the caecum and ascending colon is often associated with profound anaemia.

DIAGNOSIS

As it is not possible to make out any one diagnostic syndrome, the detection of

ileo-caecal tuberculosis in the absence of a definite palpable lump will present an interesting clinical problem. We must therefore resort to other accessory aids. The elicitation of the Von Pirquet reaction and the detection of Tubercle Bacilli in the faeces are of little importance.

A well elicited clinical history is very suggestive. The detection of another Tuberculous focus establishes a possibility. Auscultation of the abdomen and the elicitation of exaggerated peristaltic movements converts a possibility into a probability. But to convert the probability into a certainty of diagnosis we need a skiagraphic study. An isolated skiagram is of no value. Useful information is obtained both by a Barium meal and a Barium enema.

The technique of the Barium meal has been perfected by Brown and Sampson of Trudeau Sanatorium and reported by them in 1919. However the credit belongs to Prof Archibald of Montreal who suggested to Dr A. H. Pirie to make a study under X-Rays of all cases of intestinal tuberculosis referred to him for operation. Archibald published his paper in 1917 in which Pirie wrote a note from memory from a base hospital in France. I quote from these notes what constitutes the very basis of X-Ray diagnosis. He states "Some bad luck seemed to dog my steps for whereas we had formerly been able to show by means of barium meal, the position, size and shape of the normal caecum, yet we failed in these tuberculous cases, to catch the caecum at the proper time when it was filled by the meal. Finally the cause of our failure struck us. We failed to show the caecum filled by a barium meal because it never did fill when tuberculous ulceration existed. Setting out with this as a working hypothesis, we examined the cases at $\frac{1}{2}$ hour intervals from 4 to 12 hours after the barium meal. We found our theory correct in each case of tuberculous caecum viz the caecum never filled with the meal. Each small

squirt of barium that left the ileum was quickly passed on past the caecum and collected elsewhere in the large colon either in the transverse part or descending." This constitutes the very essence of the interpretation of Skiagrams. However, a little elaboration is necessary to enable one to avoid certain pit-falls in the interpretation of a skiagram where the caecum fails to show up and which has been labelled as a "filling defect."

To enable one to understand the interpretation of skiagraphic study it is important to realise that

- (1) The ileum empties itself in from 5-9 hours
- (2) The caecum usually remains partially or well filled from the 4th to the 24th hour and at times longer
- (3) A tuberculous ulceration in any part of the intestine changes the rate of movement. This change is increased motility which may be either local or general. Ulceration produces a state of hypersensitiveness and the passage of intestinal contents into this portion of the gut acts as an irritant which produces a spasm. This spasm squeezes out the contents distally so that contents are hurried past. Hence the diseased area does not show the "Fluid-Cast", and hence in ileo-caecal Tubercle, the caecum fails to show up.
- (4) Localised ulceration is often best noticed in the region where a double-fold of mucous membrane protrudes into the lumen. This is exemplified in the superior and inferior lips of Ileo Caecal valve. A broadening of this fold or eating into it may be demonstrated.

The most apt description of the X-Ray appearance of the Ileo Caecal

valve is that used by Cole many years ago. He said, 'The small intestine protrudes into the caecum at the ileocaecal valve like the head of a cobra, standing on its tail.'

- (5) Seven hours after ingestion of Barium meal the patient is screened and plated at $\frac{1}{2}$ or $\frac{3}{4}$ hour interval until 9th or 10th hour following the ingestion. The repeated observations help to distinguish the pseudofilling defects.

The two most important findings are -

- (a) Generalized hypermotility, so that Barium is eliminated in less than 24 hours and in many cases less than 15 hours. Closer observation shows that the origin of this generalized hypermotility is in the ileo-caecal region so that caecum is found to be constantly empty or only partially filled.
- (b) Where this hypermotility is not so pronounced and is more localized, the ulcerated area, generally the caecum, is not filled to capacity. This has been designated, 'Filling-defect'. Critical study suggests that this name is a misnomer. The word suggests a permanent defect in the normal outline of the "Fluid-Cast". A filling-defect in tuberculous ulceration may change materially from hour to hour while the genuine "filling-defect" as observed in Carcinoma remains relatively constant.

At this stage it is important to point out certain fallacies. There are three important types of pseudo-filling defects.

- (1) If the observations be made before the 7th hour it may happen that

enough Barium may not have entered the caecum to mark out its outline completely.

- (2) If the caecum or colon contains faecal matter unimpregnated with Barium the entry of Barium may give a faulty or ragged appearance.
- (3) Saddling of the transverse colon over the spine in the supine position or over an extra-colic tumour may prove very puzzling. Repeated observations and palpation under the screen obviate these defects.

Permanent filling defects are seen in cases where

- (1) Tuberculous ulceration is so extensive and chronic as to have altered the normal outline,
- (2) Where hyperplastic tuberculosis is present,
- (3) In cases of carcinoma,
- (4) In regional ileitis and colitis,
- (5) In amebiasis of the caecum,
- (6) In appendicular abscess & adhesions,
- (7) In congenital bands passing over the caecum.

The information given by a Barium enema is equally helpful. Watching the Barium enema under the screen, the irritability of the caecum and the inefficiency of the ilea-caecal valve may be observed.

But the finding of the greatest value in the study of colonic lesions is the study of the mucosal pattern. This is distinctly shown in films made of the colon immediately after the evacuation of the enema, while the colon is still in the contracted state. While the colon is contracted both longitudinally and

transversely, the redundant mucosa is thrown into folds with the barium caught within the meshes of these folds and is shown in the skiagram as a characteristic mucosal pattern. Where the pattern remains intact there can be no pathological lesion. The folds have a smooth outline and form a continuous uninterrupted pattern.

In non-ulcerative mucous colitis a barium coated string of mucus may be seen but barium enema will show a normal mucosal pattern.

In Ulcerating colitis before the enema is evacuated there is to be noticed a peculiar serration in the wall corresponding to the ulcer. Above and below it the margins are smooth. After evacuation of the enema the mucosal pattern is regular everywhere except in the ulcerated area. When ulcerations are advanced they are more apparent.

Hyperplastic Tuberculosis and a malign-

ant growth may look very much alike. The obliteration of the mucosal folds is marked.

The caecal area is deformed but the mucosal pattern is not obliterated. Such distortion is due to a congenital band.

I am indebted to Dr J L. Desai for the loan of skiagrams and for other help.

PROGNOSIS

The prognosis of this condition is no longer so dismal as in the days of long ago. There is a ray of hope.

The statistics of all leading Hospitals show a marked drop in the number of cases of non-pulmonary tuberculosis year after year. A city well planned with perfect sanitation is as healthy to live in as God's own country. In striking this more hopeful note I leave the subject of treatment to my colleague Dr Moolgavkar, happy in the belief that the same hopeful outlook will be continued.

TREATMENT OF ILEO-CAECAL TUBERCULOSIS

By Mr S R Moolgavkar

It came to my share to say something about the treatment of ileo caecal tuberculosis. The number of cases on which I can base my conclusions is very limited being a little over a hundred. Instead of giving you a resume of all that has been or can be done in the way of treatment of ileo-caecal tuberculosis, I propose to give you the results of my limited experience, the difficulties that I have encountered and the way in which I have tried to meet them.

Ileo caecal tuberculosis presents itself to us as a mechanical obstruction in most cases. Only rarely does it spring a surprise on us when on opening the abdomen for a supposed appendicitis we discover that there is ileo-caecal tuberculosis. These cases also if left to themselves would, in time, present all the signs and symptoms of mechanical obstruction. The obstruction being mechanical only such measures as will alter the mechanism of the part can be effective. Such measures can mainly be operative interference. I shall therefore consider these first.

Before 1923 I had not operated on any case of ileo caecal tuberculosis. The first case I remember very well. She was a Khoja lady with a small lump in the ileo-caecal region, with colicky pains coming on some time after food. I performed an excision of the ileo caecal region, removing about 4 inches of the colon and 6 inches of the ileum. The lady did very well. In fact one might say that she did not turn a hair. This encouraged me and in every case of ileo-caecal tuberculosis I came across, I performed such excisions. The sixth case was a Bania lady who did very well indeed till the tenth day when she developed tetanus and died within forty-eight hours. How this

tetanus arose, I cannot definitely say. I use catgut throughout my operations and this brand of catgut had been used for some time and had been carefully sterilized. There is the possibility of the direct interference with the intestinal canal having caused the tetanus, but one has dealt with hundreds of other intestinal cases and yet no tetanus has developed. I have come across one other case of tetanus after operation and that was after a cholecystectomy. Here also the case did extremely well for ten days and then developed tetanus and died. In this case there was no direct interference with the intestinal canal and yet there was tetanus. I am inclined to think that most probably the catgut was at the bottom of both these cases. In passing, I should like to draw your attention to a fact I noticed in connection with the tetanic spasms, and that is that the spasm of the glottis came on first, the patient got blue and then the general spasm came on. You must have noticed that when the anaesthetist uses Co_2 to stimulate respiration, twitching of muscles are very common and in fact can sometimes be a nuisance to the operator. I believe that the spasm of the glottis causes an accumulation of Co_2 in the blood and this acts as a trigger which sets off the general convulsions. If I have the misfortune to come across any other case of tetanus I certainly shall try the effect of early tracheotomy in order to minimise the general convulsions which as you know carry off the patient.

To resume, the case of tetanus I attributed to rotten luck and I went on doing excisions till about the twelfth case when I ran into a patch of very bad luck. Within two months I lost three consecutive cases of ileo-caecal

tuberculosis after treatment by excision I must say here that these cases were more advanced, the patients' condition was low and the disease extensive. In the last of these cases I tried for the first time the continuous intravenous glucose saline drip. A glass irrigator with a Canny-Ryall drip control and an intravenous canula tied in was used. This patient was boisterous, and I had to fix the limb on a splint. The effect of this drip was really marvellous and the patient revived and had he but a greater reserve of energy I feel sure he would have pulled through. I have used this continuous intravenous drip method many times since, always with marked improvement in the condition of the patient but all the patients were not saved. As one can understand this method is used only in the extreme cases, and one cannot expect it to be successful in every case. The apparatus used was at first a glass irrigator but it was soon noticed that even after rigorous sterilization fungi appeared in the glucose saline within twelve hours. I have later tried two thermos flasks connected together with a Y-tube, the glucose being run from one and when that flask got empty the other was turned on and the empty one replaced. Nowadays I use a canula which is tied into the vein and I change everything down to the canula each time the flask is empty. This is possible with the ready made flask, Cutter's or Crook's—a Canny Ryall drip and a Buckley needle-holder.

These three deaths set me furiously to think, and I then decided to do the excision in two stages first a short circuiting ileo colostomy to be followed later by the excision. Accordingly I started doing the ileo colostomies and asked the patients to come up three or four months after for the excision, but when they presented themselves I found that they had improved

very much in health. So much so that in many cases it was difficult to recognize them as the same persons who had been operated on. The lump in the iliac fossa had either got much less in size or had almost disappeared and the pain was gone. There was therefore no indication for operation and no excision was therefore done and I may say here that since the year 1926 I have done no more excision of the ileo-caecal regions for tuberculosis.

I continued doing these ileo colostomies only. The method followed being to join a loop of ileum about 8 to 10 inches above the ileo caecal junction to the transverse colon. The loop was made iso-directional with the colon. After about 2 years of this practice I came across a snag and that was that even though the patient had progressed for some time after the operation, after about two months he began to get pain in the right iliac region. This gradually increased till it reached the intensity of the original pain he used to get. On examination it was found that coincident with the pain, there arose a lump in the right iliac region identical with the conditions found before the ileo colostomy. I believe in this case the intestinal contents had got beyond the stoma and had accumulated in the ileum between the stoma and the ileo caecal valve. This caused a recurrence of the pain by the effort made by the ileum to force the material through the strictured ileo-caecal region. There must also have been a kink in the ileum just beyond the stoma so that the material could not regurgitate into the stoma. I suggested to this patient another operation to divide and close up the ileum beyond the stoma but the patient was not agreeable and I lost sight of him.

In order to avoid recurrence of such an experience, I have since always divided the ileum about six to eight inches above the

ileo-caecal junction, and closed both the divided ends by Moynihans' method and then joined the proximal end of the divided ileum to the transverse colon. I have found this operation quite satisfactory. Only once there was a little trouble and that was in a case where I had invaginated the ileum on the proximal side more than I should have. This necessitated a junction with the transverse colon about two and a half inches from the stumpy end. In this patient pain used to come on now and then in the umbilical region and one could feel a small lump in that region whenever the pain was on. It was the same story on a minor scale as with the loop method mentioned above. Fortunately however, after about three months the pain gradually disappeared. Since then I have taken good care to join the ileum on to the transverse colon as near the stumpy end as possible.

I have traced above the difficulties I have had in the operative treatment of this disease. I shall now describe in more detail the technique of the operation which I follow.

There is not much done in the way of preliminary treatment beyond giving glucose intravenously whenever necessary. I believe in giving calcium to all my abdominal cases. One hears a lot about calcium these days. One is told that calcium is almost ineffective unless it is given intravenously. We must not forget that mankind has grown up, has accumulated calcium, has built up bones all these years and centuries without having intravenous calcium given. Therefore, I am still very old-fashioned and give my calcium orally. It is only in urgent cases that I resort to calcium intravenously.

I have not yet handled a case of ileo-caecal tuberculosis which demanded transfusion of blood before operation.

Practically all my abdominal operations are done under spinal anaesthesia. I use Novocain. After trying various strengths and solutions, I now use Novocain powder 2 or 3 grains which I obtain sterile in sealed ampoules. This is dissolved in 10 cc of the patient's cerebrospinal fluid and injected intrathecally. Immediately after, Adrenalin 1 cc is injected to keep up the blood pressure, and this is supplemented by glucose saline if necessary.

The antiseptic used for the preparation of the skin is either Acriflavin in spirit 1/500 or Brilliant Green in acetone 1 in 1000.

I use a right paramedian incision 4 to 5 inches long depending on the extent of subcutaneous fat. Usually 4" suffice. The centre of the incision is about an inch below the umbilicus and the incision is placed an inch and a half away from the middle line. After the rectus sheath is opened the Rectus muscle and the Lineae-Transversae are separated by the knife from the anterior rectus sheath and the Linea Alba. It is surprising to find the extent to which Rectus fibres are attached to the anterior sheath and to the Linea Alba. The most marked attachment I have found in Jews and in Parsees. All the blood vessels which have been picked up are now ligatured. After retracting the rectus laterally the posterior portion of the sheath and the peritoneum are picked up and incised. The caecal region is felt and later inspected by retracting the incision laterally. Visual evidence of tuberculosis is sought and is but rarely lacking. I once came across a case which I had taken to be an ordinary chronic appendicitis and at operation I found that the appendix was thickened mostly for its distal two thirds and there were tubercles on it. I took it to be a case of tuberculous appendicitis and removed the appendix and closed the abdomen. The patient did well, left the nursing home and went away for a change.

About five weeks after operation the patient began to get pain in the abdomen together with a low fever. She soon developed typical tuberculous peritonitis and was dead within six months of the operation. It is very difficult to say whether here the original disease just went on or whether my interference with the tuberculous appendix assisted or caused the spread of the disease. Anyhow I am really chary now of interfering with tuberculous tissue directly. I have had similar experience elsewhere. I used to be very fond of dissecting out tuberculous glands in the neck. The more extensive the disease, the more adherent they were, the more I enjoyed the operation. The heaving internal jugular vein and the knife so close and yet so safe, added to the enjoyment. Yet two cases and both these bilateral ones developed tuberculous meningitis, one ten days after and the other three months after the second operation and both of them died. This has made me pause and think, and I must say that I am not so keen on removing tuberculous glands these days.

To resume the operation. The transverse colon and the ileum are next inspected. Often there are tuberculous ulcers. At least three feet of the distal ileum should be inspected. I once found a tuberculous stricture in the ileum two feet from the ileo-caecal valve in addition to the ileo-caecal tuberculosis. If the anastomosis had been performed distal to the ileal stricture there could have been no benefit from the operation. The policy should be to leave as little ileum attached to caecum as is possible. As the distal part of the ileum is normally bound down to the posterior parietes this works out at about 6 to 8 inches above the ileo-caecal valve. The selected portion is lifted out of the wound and the loop so formed is emptied and clamped and abdominal towels are arranged so as to isolate the loop. I always use a Child's clamp. The teeth on it prevent the loop slipping and it certainly is invaluable

for stomach cases as the stomach is a great wriggler and will wriggle out of most of the clamps. Two Moynihan's duodenal clamps are next applied $\frac{1}{4}$ inch apart at the selected point of division of the loop. Gauze pads are now arranged round about to prevent any contamination. The loop is next divided between the two duodenal clamps. I use either a Paquelin or a Galvano cautery for the division.

Only once I used a Diathermy machine for this purpose and I found that the portion of the bowel and mesentery grasped by the Child's clamp was cooked and I had to excise that much loop. The Child's clamp compresses the bowel and makes a flattened band of tissue. The resistance to the passage of the current is greater here because of its narrowness and the portion within the grasp of the clamp gets over-heated and cooked. After division, the portions of the ileum projecting beyond the Moynihan's clamp are thoroughly cauterized, and later invaginated according to the Moynihan technique. The Child's clamp is next removed. The distal stump is returned to the abdomen, the proximal one is kept out of the wound. The great omentum is next sought for and pulled down and the transverse colon delivered out of the abdomen. The colon is next clamped by a Child's clamp, with the inferior tenia in front. This gives you a surface suitable for anastomosis. The proximal stump is next brought near this and made iso-directional taking care not to twist the bowel and is then clamped. It should not be clamped in the form of a loop but as shown in the diagram on the next page.

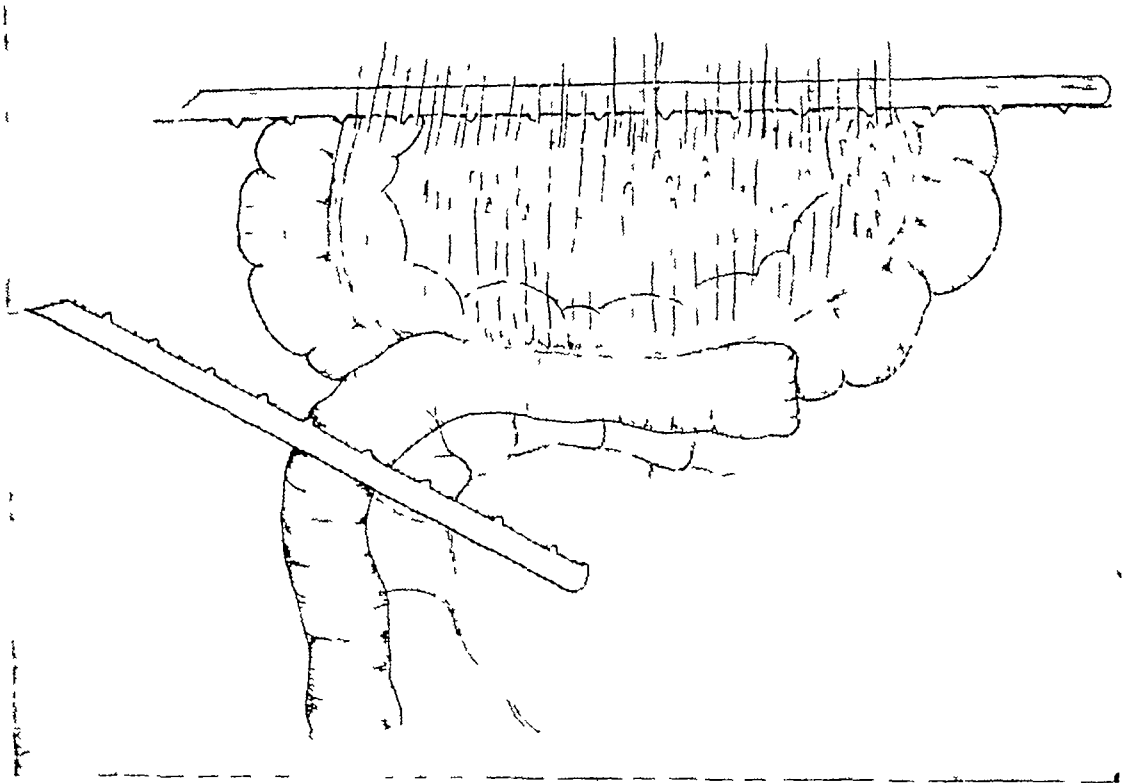
A lateral anastomosis is next established between the colon and the ileum. The stoma need not be long, about one and a half inches is quite big enough. As I have pointed out before, the stoma in the ileum should be as near the stumpy end as possible. I use two rows of

suture After completion of the anastomosis the portion of the ileum proximal to the anastomosis is anchored to the mesocolon by a few stitches about 1 inch apart in order to prevent kinking The bowel is then returned into the abdomen and covered over by the omentum The abdomen is next closed

It happens sometimes that ulcers are found in the transverse colon These can usually be felt from outside The anastomosis should avoid these Once I cut across

the symptoms were urgent I took a chance and did an anastomosis The patient got over the operation quite well, was relieved of his obstructive symptoms but died about four months later

With thickened peritoneum I like to leave in the stitches for a few days more than in the ordinary cases I then remove the stitches on the fifteenth instead of on the tenth day



the end of one such ulcer while making the stoma I had not been able to feel this ulcer from outside I was in great trepidation as to what would happen Fortunately the patient did quite well

Exceptionally one comes across a colon which is studded over with tubercles In one such case the signs of obstruction at the ileo caecal junction were marked and when I found the colon studded over, I was inclined to close up and do nothing more, but as

The after treatment does not differ materially from ordinary abdominal cases except that whereas it is my practice to have a soap water enema administered the morning following the operation, in these anastomosis cases, I order only glycerine syringes for three days The castor oil which is administered on the third day in ordinary cases is postponed till the fifth day in these cases The patient is kept on liquid diet for two or three days more in these cases than in ordinary cases

The immediate mortality of this operation has been nil so far in over a hundred cases and though I cannot hope to continue this good luck for ever I can with confidence say that this operation is borne by even weak patients very well. I take care to see that the parts are not handled more than is absolutely necessary.

The results of the operation are extremely good. The patient is made comfortable almost immediately after the operation. The fear of that pain after food is soon overcome and the patient begins to eat well and there is usually a definite change for the better even before the patient leaves the hospital. As I have said before, in many cases the change is so marked within a few months that it is at times difficult to recognise the patient.

Of course, there are other cases where the disease has already got hold of the patient generally, and here the generalization of the disease has the final and often a fatal say in the matter. Such generalization may be either a pre-existing focus in the lungs or a tuberculous peritonitis, but even here the lot of the patient is much improved by the operation, and I feel certain his life is prolonged and made more comfortable.

Our duty does not finish with the performance of an operation. We have by operative measures overcome the mechanical obstruction by providing a by-pass and have at the same time achieved the most fundamental principle in the treatment of inflammation and that is Rest. Now we have further to direct the patient so, that he can receive the maximum benefit from the operation and build up his body resistance.

Already the patient has regained confidence regarding food and in most cases he regains his appetite as well. Most

foods may be allowed but one kind of food must be strictly interdicted and that is spicy food. Spicy food has to be avoided till the patient has reached normality in every respect.

If the patient can afford it, he is advised to go for a change. Here in Bombay one advises the patient to go to Panchgani, Mahabaleshwar, Nasik, Poona, Lonavla, Belgaum, or Bangalore. He is asked to lead an open air life and to take walks which should gradually be increased. His strength should not be overtaxed however.

Exposure of the naked skin to the morning sun is also advised. In towns or wherever available Ultra Violet lamp rays are also recommended.

Talking about Physical therapy I have tried Deep X-ray treatment particularly in cases accompanied by tuberculous peritonitis, I must say with some but not with very marked benefit.

In all these cases I advise the taking of Cod liver oil. I have no great confidence in all the various substitutes and concentrates. I have always pinned my faith to the good old stuff. I always prescribe it in the form of an emulsion, accompanied by *Syr Ferri Iod m 15*, and *Syr Hypophos Co* one drachm per dose. I give $\frac{1}{2}$ —1 dr of the cod liver oil at the first once a day and according to the reaction of the patient increase it to twice a day or decrease the dose. I have found the following plan of emulsification very good and it enables the patient to take an interest in his own treatment. I ask the patient to take the yolk of an egg in a cup or *चढ़ी* and with a stainless steel mechanical egg beater—I mean the kind with a wheel attached which you turn—to break up the yolk and then add the requisite quantity of cod liver oil drop by drop taking about five minutes in the

process The Syr Ferri Iod & Syr Hypophos Co are next added slowly, churning the while Milk is added a little at a time using 3-5 ozs Honey or Malt extract may be added now if desired as also any flavouring agent such as Vanilla, Cinnamon, or Cardamoms and Nutmeg I can positively say that the emulsion is the best form in which to give cod liver oil

Gentlemen I thank you for the patient hearing you have given my poor effort I do not claim any originality for what I have said to day, but each change in the technique of the operation was the result of some difficulty which demanded it and not simply because there was something different to be tried I only hope that some of you will find something useful to you in what I have said

A DISCUSSION FOLLOWED —

Mr S J MEHTA, F R C S (Bombay) said that until 1932, he did only lateral anastomosis for such conditions but the symptoms of pain after food and subacute obstruction recurred Later he followed the exclusion technique as suggested by Mr Moolgavkar, and the results were better but not entirely satisfactory He described a case which did not benefit at all after such an operation and the lump in the right iliac fossa instead of getting smaller had grown enormously and became inoperable subsequently In his opinion excision of the lump, with lateral anastomosis between the small intestine and the transverse colon, in a very early case, when the lump is strictly localized to the ileo-caecal region and with no involvement of the small gut higher up, is an ideal operation and should be done in such a case to get entirely satisfactory results He did not agree with Mr Cooper, who had suggested that marked anaemia was not a regular factor of local tuberculous lesion of the large intestine

Mr M G KINI, M C, M Ch, F R C S E (Vizagapatam) thought that it was an opportune time to discuss Surgical Tuberculosis as a lot of propaganda work is being done against the scourge of Tuberculosis and funds are being collected for the prevention and

cure of this disease It is a matter of great regret that propaganda is carried on only for Pulmonary Tuberculosis and Surgical Tuberculosis is not even mentioned The speaker at one of the meetings conducted for collecting funds spoke about the need of inclusion of Surgical Tuberculosis in the propaganda

In the Andhra area he had operated upon 25 cases of Tuberculous Abdomen Out of these five cases were Ileo caecal Tuberculosis Three other cases which were diagnosed as Ileo-caecal Tuberculosis refused operation The cases of Ileo-caecal Tuberculosis were admitted with a history of fever and lump in the right iliac fossa etc These were diagnosed as typhoid fever in the beginning as stated by Mr Cooper and were treated as such by a scientifically trained doctor The indigenous Hakims and Vaidas who treated them subsequently used drastic measures of starvation On admission their condition was very poor being extremely emaciated with very low blood pressure The treatment adopted was Ileo-Colostomy without exclusion of the terminal ileum as suggested by Mr Moolgavkar They constituted a grave surgical risk due to their run down condition One of the patients died in the hospital after two months The others did very well and

are alive and well to-day. The speaker was of opinion that every surgeon has his own technique and more detailed statistics with follow-up have to be published before one can decide which method gives uniformly good results. He carries out the pre-operative treatment as described by Crile and local anaesthesia is the anaesthetic of choice used to prevent shock. He described a case of tuberculosis of the appendix in a medical student who was suffering from recurrent attacks of acute appendicitis of a mild type. At the operation the appendix was found to be thickened in the distal third with no tubercles on the surface. There was no involvement of the caecum. The appendicular glands in the mesentery of the appendix were enlarged and were removed. The diagnosis of Tuberculosis of the appendix was made by microscopic examination when typical tuberculous lesions in the submucous tissue were found, the glands did not show any evidence of tuberculous infection. The patient is alive and well to-day, five years after the operation, and is following his medical education. He is an all round sportsman.

Mr N C. JOSHIE, F A C S, (New Delhi) gave an experience of 67 personal cases. He was of the opinion that temperature is an index of the activity of the lesion and he does not operate on such a patient until the pyrexia disappears. Pain is an indication of some obstruction and it is the surgeon's duty to correct this. In his opinion, operation on a patient with temperature made the condition worse and the patients went downhill rapidly. With pulmonary lesion present at the same time no operation is advised. Pre operative measures are necessary to improve the poor condition of the patients. He always operated under local infiltration anaesthesia produced by Novocain. In one case, when he was forced to operate although

the general condition of the patient was low, he used Murphy's button to relieve an obstruction at the same time to diminish the time of operation. The Surgeon should warn the patients about the risks of future pregnancy and the speaker made it a point now-a-days to get the consent of the patient as well as that of the husband to ligature the Fallopian tubes at the time of the operation. Medical treatment was very essential after the operation. We should know our limitations as surgeons. We can only relieve obstruction in such cases. In the upper part of India, he had not come across a case of true hyperplastic Tuberculosis of the caecum, the usual experience was that of the Ulcerative type. He met with one case only of true hyperplastic Tuberculosis of the small intestine, in whom excision was done but the patient expired. In another case of Hyperplastic Tuberculosis of the sigmoid, caecostomy was done primarily and at the second stage resection was done with a happy result. In one case of Tuberculosis of the ileo-caecal region, only ileo colostomy was done elsewhere, some 6 years previously. The patient developed symptoms such as pains in the abdomen etc. She was under observation for 6 weeks when a second operation was done, when the small bowel was cut across distal to the anastomosis and the ends were buried by Lembert sutures. The result was very satisfactory. He has not done any resection so far for this condition and reserved this operation only for cancer of this region.

Mr V L PARMAR, F R C S, (Bombay) was of the opinion that it is much better to play for safety, when carrying out an extensive operation on Indians, whose vitality is none too good to withstand such a procedure. He favours resection, as this removes the tuberculous focus from the body. This operation is never done

in one stage but always in two. At the first stage lateral anastomosis is done between the small intestine and the transverse colon, the former is cut across distal to the anastomosis. He was of opinion that after this if the mesentery of the small intestine is cut across two inches below it diminished the chances of kinking. The operation of resection is done later on as the second stage. He advises local infiltration anaesthesia or spinal anaesthesia. If the local is combined with caeliac ganglion block, even extensive resections can be carried out without appreciable fall in the blood pressure. He agreed with Mr Moolgavkar in the administration of calcium by mouth before the operation. There is a general tendency to think that calcium given by such a route does not act. But his experience is otherwise.

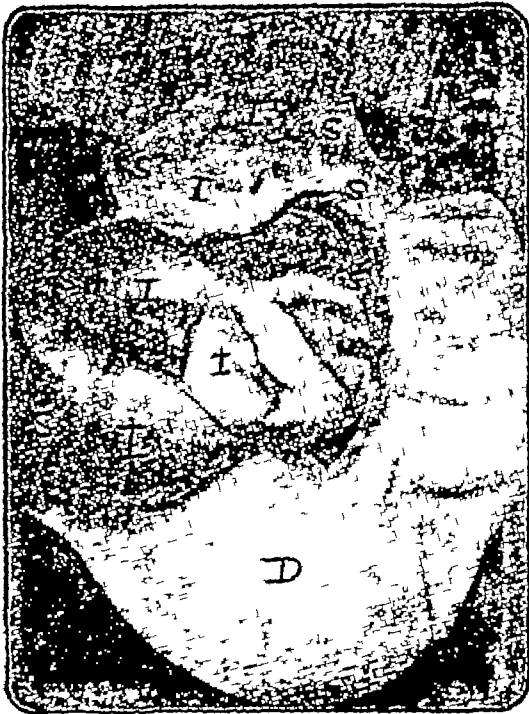
Mr M V MODY, F R C S (Bombay) did only lateral anastomosis until a few years ago, but found that the results were not satisfactory. Then he started resecting the lump and had good results. He is in favour of one stage operation when possible, with end to side anastomosis.

Mr KHURSHED HUSSAIN M B, Ch B (Hyderabad, Deccan) gave his experience of 34 cases of Ileo-Caecal tuberculosis, without any involvement of any other organ in the abdomen. He was of the opinion that the disease primarily starts in the caecum and then spreads downwards to the ascending colon and upwards to the appendix and the small intestine. This was not surprising. In the stomach the only area, which is comparatively anaemic, was along the lesser curvature, where one finds the majority of the pathological conditions in that organ, similarly a comparatively anaemic area of the caecum, along its right lateral wall, is the place where tuberculosis of the caecum begins.

Again the caecum forms a pouch where intestinal contents stay for some time. This may provide an opportunity for the Tubercle Bacilli in the contents to work against the mucosa of the intestine. Only in one case did the speaker come across a tuberculous lesion restricted only to the appendix, which was removed and the patient did not develop any further lesions. In the hypertrophic variety one comes across tremendous deposition of fibro-fatty tissue locally. This, in the opinion of the speaker, was an attempt on the part of Nature to check the spread of the disease. In this variety was of the healing type. The above mentioned deposit produces a lump in the right iliac fossa. Contraction of the fibrous tissue may produce obstruction of the lumen of the bowel. At the same time the contracting mass raises the caecum from the most dependent position in the right iliac fossa. This results in the production of an obtuse angle at the junction of the caecum with the terminal portion of the small intestine. This fact when well illustrated by radiography is of great help in diagnosis. As the deposition of fibrous tissue represents an attempt towards cure, the speaker was of the opinion that the lump should not be interfered with, and the obstruction alone should be corrected by short circuiting. The mass subsides after the operation and in none of his cases, resection was necessary. Subsequently the condition of the patient improves tremendously after the short-circuiting operation alone.

Mr S SUBBA RAO B A, M B, M R C S, (Bangalore) said that no reference was made by the previous speakers about the occurrence of plastic peritonitis. In some cases, round about the coils of intestines having tuberculous lesion, thick bands may be formed leading to intestinal obstruction. He described the case of a young woman of twenty years,

who had ileo caecal tuberculosis. As the result of plastic peritonitis a complete adventitious sac had been formed incarcerating a few coils of gut (I) measuring over 4 feet in length, and producing signs and symptoms of chronic intestinal obstruction. The portion of small intestine above the sac was so much dilated (D) that it resembled the stomach in size and shape. The whole mass was resected and a lateral anastomosis was performed between the ileum and the ascending colon. The patient was very well for about 8 years after the operation, when she developed pulmonary tuberculosis and died. A photograph of the specimen removed is given below.



Mr S B GADGIL F R C S (Bombay) said that one aspect of intestinal tuberculosis had not been touched upon by the surgeons taking part in the discussion so far.

In his early surgical experience which went back to about forty years, tuberculosis of the intestines seemed to have no other

treatment but exposure of the diseased gut after laparotomy to fresh air and sunlight. The patients did extremely well and gained in weight. An improvement was made in this treatment after a few years when Ultra Violet rays were being used and this was followed later by injection of oxygen in the peritoneal cavity.

In his opinion, in cases of tuberculosis of the ileo-caecal region where the lesion is ulcerative and not obstructive due to hyperplastic disease more use may be made of conservative methods such as simple exploratory laparotomy or inducing pneumoperitoneum. Though once held to be a curative treatment, one might say this treatment has merits. It certainly gives great relief to the patient. It has been found that spasmodic pains, flatulence, anorexia, cramps are symptoms very much relieved. The triad of symptoms of ileo caecal tuberculosis viz constipation, cramps and pain in the right lower quadrant of the abdomen, disappear. Diarrhoea is the only symptom not relieved much, but considerable improvement takes place in that respect as well. Intestinal Haemorrhage is not arrested at all.

In cases of hyperplastic tuberculosis giving rise to obstruction, some short circuiting operation must be performed. As regards the method of anastomosis, he does not think there is any merit in any one form of operation than another. Obstructive symptoms are relieved and the patient is much improved, by any operation properly performed.

American surgeons have developed the idea of pneumo-peritoneum. They introduce oxygen by a puncture in the middle line a little above the umbilicus, preceded by evacuation of the bowels by an enema. They have got some good results.

Mr Khurshed Hussain has said that tuberculosis attacks non vascular

parts of the body but he thinks every one will agree that it is the vascular organs like lungs and cancellous bones that are more affected by tuberculosis than the non-vascular organs

MR A V BALIGA, F R C S (Bombay) was of the opinion that in order to diagnose a lump in the right iliac fossa as that due to hyperplastic tuberculosis of the Ileo-caecal region, the lump should feel nodular on the surface. He mentioned two cases with a lump in the right iliac fossa with continuous dull pain and loss of health etc. In both the lump was smooth and at the operation it was found out that the lump was produced by a thickened spastic caecum associated with a pathological appendix. In patients with diarrhoea and temperature which are poor surgical risks he advises calcium by mouth or preferably by injections. Unless these symptoms are completely controlled, the patients should not be operated upon. The operation is done easily under spinal, but if the Blood Pressure is low as is often the case, regional block combined with local infiltration anaesthesia was very satisfactory. He gave the statistics of the K E M Hospital, where during the last 10 years, 99 cases of Ileo caecal tuberculosis were admitted. Sixty-four of these were operated upon and in 49 lateral anastomosis was done, in only 11 of them the terminal ileum was cut across as was done by Mr Moolgavkar. There were 8 deaths in this series, 2 died of acute obstruction on the top of chronic, 2 died with faecal fistula, 2 died of pulmonary tuberculosis which was not suspected before the operation and the cause of death in the remaining 2 was not known. He mentioned 7 cases where primary excision was done with 2 deaths, on the 3rd and 4th post-operative days, probably due to paralytic ileus.

He gave a record of 12 personal cases, where lateral anastomosis alone was done,

with one death due to paralytic ileus. Two patients came back with symptoms, in one the lump was actually bigger, than before, whereas in the other the lump was smaller, but both had constitutional symptoms and diarrhoea and the latter developed a faecal fistula later on. Both these patients had at the time of lateral anastomosis, excisable lumps.

He has done two stage Excision in 4 cases, all of whom have done well and are clinically cured. The lateral anastomosis alone gave good results only temporarily. The speaker put in a plea for a two stage resection as a routine in suitable cases.

Mr M D PATEL, F R C S (Ahmedabad) was of the opinion that tuberculous lesions of the abdomen differed in different parts of the country. In Ahmedabad, he came across more cases of affection of the small-intestine, as well as that of the Ileo caecal region together, rather than the localized Ileo-caecal type. In his opinion the two stage operation was difficult. He agreed with Mr Moolgavkar who was in favour of removing stitcher, from the abdominal incision rather late. In the after treatment of these cases he is a strong advocate of tuberculin injections given weekly. This is done with the co-operation of the physician.

Dr V N SHIRODKAR, M D, F R C S (Bombay) said that because the patients came back with pains in the abdomen etc after the operation mentioned above, it did not mean that the operation was insufficient. The pain is due to the spread of abdominal tuberculosis for want of resistance. He described a case, where a gynaecologist had removed tuberculous Fallopian tubes some 18 months before, but the patient did not get any relief from the symptoms. The case was reinvestigated and at the time of the 2nd operation

a tuberculous ileo-caecal mass was found. He suggested routine examination of the pelvis when the abdomen was opened and advised gynaecologists to carry out a routine examination of the ileo caecal region when a laparotomy was done for Tuberculous Tubes. The suggestion of Pneumoperitoneum by oxygen for the treatment of abdominal tuberculosis was rather interesting to him as a gynaecologist, as he could carry out the procedure by the Rubins method easily.

Mr M M PANDYA, F R C S (Bombay) was of the opinion that a routine two stage operation was not desirable. At the 1st stage, lateral anastomosis should be done and, if symptoms etc did not improve, then only the second operation of resection should be done.

Mr K G MUNSIF, F R C S (Bombay) believed that if the patient did not improve after the lateral anastomosis, he came from a tubercular stock. In his opinion heredity was responsible. He agreed with Messrs Moolgavkar and Parmar in calcium administration before operation, given either by the mouth or by injections. He suggested examination of the entire small intestine for tuberculous lesions when a laparotomy is done, and mentioned one case of pains in the abdomen etc where laparotomy revealed a tuberculous mass in the region of the duodeno-jejunal flexure. He emphasised the importance of after care of such patients who had been operated upon either by one or two stage operations.

Mr K C. GHARPURE, M S (Poona) was of the opinion that it would not be fair to talk of ileo-caecal tuberculosis. We should think of tuberculous abdomen, which included the following -

a Tuberculous Mesenteric glands

- b Tuberculous ulcers of the small intestine
- c Hyperplastic Tuberculosis of the caecum
- d Tuberculous peritonitis
- e Tuberculosis of other abdominal organs

He laid a great deal of stress in diagnosing tuberculous mesenteric glands in young adults, who complained of dyspeptic symptoms, loss of weight, vague pains in the abdomen etc. A thorough investigation of the gastro-intestinal tract did not help at all and at the operation tuberculous mesenteric glands were found. In the text books it is mentioned that Tuberculosis Mesenterica is a disease seen in childhood as a rule, but in the opinion of the speaker it should be diagnosed more often in the adults who complain of the above mentioned symptoms and who do not present any physical sign on examination. In his opinion hyperplastic type was a healing type of tuberculosis of the intestines and he did only lateral anastomosis in 20 cases with very good results. There were two deaths in this series.

Mr M C CONDILLAC (Trichinopoly) agreed with Mr Cooper that absence of the caecal shadow in Barium meal radiograms was a constant finding in nearly 300 cases of tuberculosis of the caecum.

This sign was met with fairly early. Irritability of the caecum produced rapid emptying and the consequent lack of shadow. This irritability seems peculiar to the condition.

Mr R N COOPER, M S, F R C S (Bombay) replied that the amount of involvement of glands was important in deciding which operation should be done. The significance of the glandular lesion is, that when

left behind it can flare up any time. The cause of pain in these patients was not necessarily due to obstruction but was due to faulty peristalsis.

Mr MOOLGAVKAR, replied that in a patient with blood pressure between 100 and 90 one can give spinal, with intravenous glucose saline at the same time. In his opinion Stovain was more toxic than Novocain.

The President, Col PANDALAI, FRCS (Madras) was of the opinion that Ileo-caecal tuberculosis was a common lesion easy to diagnose and that when it was suspected the patient should be given the benefit of Surgery. He was inclined to be radical (Resection) whenever possible, the deciding factors being the general condition of the patient and localisation of the disease to the Ileo-caecal region. He uses spinal anaesthesia for these cases and has a preference for Stovain for lower abdominal surgery while for operations on upper abdomen, he uses Novocain solution. He resects whenever possible the terminal Ileum, Caecum, Ascending colon and half of Transverse colon and prefers to perform a lateral anastomosis after closing

the cut ends of the bowels. During the after treatment he has occasionally noticed two unpleasant complications

- (a) A slowly developing generalised peritonitis of the silent type, which is difficult to diagnose and generally ends fatally
- (b) A localized abscess of pyococcal origin in the bed of the right colon. This has occurred even after careful peritonisation of this area. He, therefore, advises drainage of this area by a stab drain posteriorly as a precaution in all cases of resection.

Resection may be done in two stages if the condition of the patient so demands and deserves wider adoption in view of a possibility of error in diagnosis (Terminal Ileitis).

In spite of a successful operation, the patient may die of Tuberculosis affecting some other organ in the body later but if we believe in the accepted rule in Tuberculosis of removing as much disease as we safely can, we should not hesitate to practise radical Surgery in this disease when conditions are favourable therefor.

CARCINOMA OF THE TONGUE

By Mr V L Parmar, F R C S Professor of Operative and Clinical Surgery, Grant Medical College, Surgeon Sir J J Hospital Hon Surgeon Sir H N Hospital, Hon Surgeon Parsee General Hospital, Sometime Orthopaedic Surgeon G T Hospital Member & Dean of Faculty of Medicine, University of Bombay

Mr President, Ladies and Gentlemen,

At the very outset let me thank the chairman and members of the reception committee for having asked me to initiate a discussion on Carcinoma of the Tongue. I particularly stress the word initiate, because I feel that it is impossible for a general surgeon, who has not made a special research on the subject, to give a considered opinion on this matter, which has undergone rapid changes in the method of its treatment. Besides at the hospitals where I work, one of my colleagues possesses Radium to whom almost all the cases of Carcinoma of the Tongue are referred for treatment, because it is now well-known that if Radium is of definite utility in any disease, it is so in cases of Carcinoma of the Tongue. Therefore, like me the other general surgeons at these hospitals play the part of a casualty-clearing station so far as Carcinoma of the Tongue is concerned.

India offers a very fertile field for research in Carcinoma of the Tongue. There live in this country, people belonging to different nationalities. Some of these in their physique and the colour of their skin approach very nearly the European type. In Assam and Burma the people are definitely Mongolian in type. In the south we have people of the Dravidian stock, the original inhabitants of India. Over the rest of the country the people are of the average Indian type. These different types of people have more or less definite habits of living and eating which vary very much and are dictated either by religion or custom. Some are purely vegetarians, others not so. In the dietary of some, spices are used ex-

tensively. To many, alcohol in any form is forbidden, whereas others habitually chew either betel-leaves, betel-nut, 'Chunam', or tobacco or a combination of these. Some smoke, others do not. In all these different types of people with their varying habits, Carcinoma of the Tongue is found.

It would be an interesting study both from the medical and the social point of view to find out the percentage of incidence of Carcinoma of the Tongue amongst these different types. For such a useful study to be carried out there must be two things. We must have first of all sufficient funds at our command to pay a reasonable amount to those who devote all their time and energies to this task, which is enormous in proportions. We have at present absolutely no money to pay such workers and I appeal for greater support both from the authorities as well as from the rich public. But it is not merely sufficient to have the necessary money. It is a type of study which is both clinical and statistical. It is the latter which we again so sadly lack. Any one of us who has attempted such a study, even on the most minor scale, from the data collected at our hospitals must have realised the impossibility of the task. So again I plead for the organisation of a special department of statistics in connection with every important hospital in the country and a unification of methods of such research. Without such support and organisation we must for ever depend upon the work of other countries, for work which should be done by us.

The present study has been based on the number of cases of Carcinoma of the Tongue admitted to the Sir J J Hospital,

Bombay during the last ten years 1928-1938

The first thing that strikes us is the comparative rarity of Carcinoma of the Tongue in and around Bombay. In ten years only 135 cases were admitted to the Sir J J Hospital, 140 to the King Edward VII Memorial Hospital and 200 to the Sir Harkisandas Hospital. Considering the large area from which patients come to the big hospitals of Bombay, the number is very small. Those of us who have visited European clinics must have been struck by the greater frequency with which this disease is met with in every out-patients department there.

ETIOLOGY ---From the data collected we can form no definite idea of the ultimate or immediate cause of Carcinoma of the Tongue. It has been a common idea amongst people, that in India betel-leaf chewing favours the development of Carcinoma of the Tongue. No confirmation of this hypothesis is forthcoming from the data at our command. As will be pointed out later, all likely factors which might stimulate the onset of such a growth affect the anterior part of the tongue, whereas we have found that this disease occurs much more commonly in the posterior part.

RELIGION --As far as religion is concerned this disease is almost equally distributed amongst the two main communities of India.

AGE —The age distribution brings out the comparative rarity of the disease towards the extremes, the greatest incidence being between 31 and 50 years.

SITUATION —The growth is situated much more frequently in the posterior one third of the tongue than in the anterior two-thirds, a fact which is remarkable, because factors like syphilis, spices, spirit and dental infection affect more commonly

the anterior two thirds. What is the explanation? It is one of the points requiring further research.

TYPE —The ulcerating type of Carcinoma of the tongue is by far the commonest met with in Bombay for it accounts for 60 percent of all the cases. The fungating type is also present, but in much fewer numbers.

SECONDARIES —The most disquieting feature of all and one which reflects badly on the ignorance of our public regarding the gravity of the disease, is the number of cases that seek medical aid for the first time when there are already enlarged secondary cervical lymphatic glands. As many as 72.5 per cent of cases admitted to the J J Hospital, have metastases in the lymphatic glands when admitted. In some of them the glands are already fixed to the deeper structures or are even ulcerated. In this connection it is interesting to note that peripheral metastases are extremely rare, in cases of Carcinoma of the Tongue. It is another problem worth investigating. Is it due to the fact that those suffering from Carcinoma of the Tongue die too soon to develop peripheral metastases? Or is it from some intrinsic character of the growth itself? It certainly merits further work. If ever we are going to deal with the problem of curing people suffering from this disease we must get cases at a much earlier stage. The people must be educated to see their family doctors as soon as they notice anything abnormal in their tongue, especially in those over the age of 30, as it has been definitely proved by our statistics that the percentage of incidence increases after this age. We must have for this, greater co-operation from family doctors who are best suited to carry propaganda into the homes of their patients. Nor must we neglect the lay press which if properly instructed can do much to dispel this ignorance. Until some remedy

more powerful than the scalpel or radium is discovered the only hope of successfully dealing with this disease is early detection and treatment. We may go so far as to advocate a compulsory routine examination of the tongue of all persons over the age of 35, once every six months.

SYMPTOMS—The list of symptoms for which patients first sought advice or those which were associated with the presence of a new growth of the tongue, again reflects the advanced stage at which people seek medical aid. In 42% of cases pain was complained of in the lower jaw, neck or ear. 41½% complained of dysphagia. Movement of the tongue was impaired in 37% and marked salivation was present in 18½%.

DIAGNOSIS—It was the fashion, years ago, to give Potassium Iodide to the patient when in doubt as to the diagnosis. When nothing better was available it was an excusable method. Since we have now a much surer method at hand, we must not fail to make use of it. Whenever in doubt a proper biopsy must be done and nowadays it is recommended for all cases, in order to group the growth histologically for better guidance.

In differential diagnosis we have particularly to consider the hypertrophic type of Tuberculosis of the Tongue. The former can sometimes be differentiated only by a biopsy which stresses the importance of doing it in every case as I have already suggested.

Syphilis affects the centre of the tongue more commonly than the periphery. The gummatous ulcer has clear cut, clean, slightly undermined margins. In the early stages there is a wash leather slough on the surface, it is painless and there is no infiltration. Besides, glands are not enlarged in spite of lapse of time. Mobility of the tongue remains unimpaired. The Wassermann reaction may be positive and administration of Potassium iodide and other anti-syphilitic remedies soon resolves it.

Ladies and Gentlemen, let me thank you for the patient hearing you have given me this afternoon. Before I resume my seat I wish to express my very great thanks to Mr D R Bharucha, F R C S for the great pains he has taken to collect statistics and his willing collaboration and help extended to me. My thanks are also due to my two Housemen, Mr J P Pankh, M B, B S, & Mr S J Bhatt, M B, B S, for their help.

TREATMENT OF CARCINOMA OF THE TONGUE

By Mr S J Mehta, F R C S

Mr President, Ladies and Gentlemen,

At the very outset, I wish to say that I have not had sufficient notice about my addressing you today. You have been presented by my friend Mr Parmar with the statistics of the cases treated at the J J Hospital. I have had no time to prepare any such statistics, nor to present you with the results that I have been able to obtain in my practice. I am sure, you will pardon me for these omissions.

Before I go into the treatment that I follow, will you permit me to point out a

few facts which will give you an idea of the difficulties under which one has been working?

I began this work earnestly in the latter half of 1932. In order that Radium therapy should not be wholly condemned before a fair trial was given, I had to collect a few cases and show the results, (Immediate of course) of the treatment. Surgeons were not willing to give me early cases, but were quite willing to give me inoperable late cases. For the first one year these were the only cases I had. Immediate results in these cases

were so favourable, that I have now obtained the surgeons' whole hearted support and co-operation for which I am indebted to all my colleagues at the J J Hospital. I will be failing in my duty towards a few members of the K E M Hospital staff and the G T Hospital staff, who have referred their Hospital as well as private cases for treatment to me. Allow me to thank them all for their kind co-operation and encouragement. It was easier to convince the surgeons, than the general practitioners. It is entirely in the latter's hands to send these cases for treatment early, but I am sorry to say that a very small percentage of cases ever come for treatment at that early stage, when the primary lesion has not spread and given rise to clinical metastases in the lymphatic glands. Mr Parmar has shown by the statistics, that a very large number present themselves with metastases. The reasons for this deplorable state of affairs are many. The general public has been made to believe that cancer is incurable, this belief also prevails amongst the medical men. This makes them hesitate in telling their patients that they are suffering from carcinoma. Most of my private cases have been treated as syphilitic, and they continue to treat them with antisyphilitic remedies for periods upto six months, before the doctor revises his diagnosis, and sends him for treatment. I should like to draw your attention to the fact that iodides relieve the pain even in carcinoma for a few days, which misguides both the doctor and the patient. What surprises me most is the fact that medical men have continued with the antisyphilitic treatment, without even examining the blood for the Wassermann reaction or the Kahn test. In my practice, I can easily count the number of cases which had syphilitic ulcers of the tongue—it does not exceed a dozen. Two out of those 12 cases, have become malignant. One was being treated as a gummatous ulcer on the dorsum of the

tongue in our venereal department. As it refused to heal under efficient treatment, Lt Col Jelal Shah referred the case to me for a biopsy report. The pathological report of the section showed that carcinoma had developed on top of a gummatous ulcer at one of its edges. The other was a frank case of leucoplakic ulcers with a positive Wassermann reaction of his blood. He was being treated by a consulting physician with antisyphilitic treatment for a period of 4 months. As it did not show any signs of improvement, he started treating him with local injections of Fischera serum No 365. This was injected in the tongue and in the glands for a further period of 3 months. At the end of this, the patient thought of changing his doctor.

Before I go further, I should like to draw your attention to a personal observation. All the gummatous ulcers becoming malignant have shown a very poor response to radiation with Radium. In future I will treat them with the knife. All the leucoplakic ulcers which have become malignant have required a much smaller dose of Radium than the others.

Besides the above difficulties, I was faced with another one, and that was the shortage of beds. Patients have to wait sometimes for as much as six weeks before they are admitted into the hospital.

The greatest difficulty of all was the ignorance of the patients. Every patient on discharge from the hospital is given a card in which is stated the date on which he has to come again for examination or for further treatment. These cards are printed in three languages—English, Marathi and Gujarathi. Very few have observed the instructions given to them. Once the primary growth heals, the pain and the discomfort disappear. The general health improves. Excessive salivation is gone. More nourishment can be taken. They feel quite fit. This makes them believe that they

are cured, and it is unnecessary to go back, and are lulled into a false sense of security I have brought here one patient to prove this. He was treated four years ago for a carcinomatous ulcer of the floor of the mouth, involving the lower surface of the tongue and the frenum, with metastases in the left submaxillary lymphatic glands. As you will see, his primary growth has healed up and there is no local recurrence even now. He was given the card in which was stated a definite date for re-examination and further treatment for the glandular involvement. For four years I lost sight of him. He comes now for the treatment of his glandular metastases, as they have become painful.

Even my private patients behave in the same manner. Here I have to fight against another factor. Some of them think, that the doctor wants to get some more money out of them by advising further treatment. Even educated patients have failed to come up in time for the treatment. You will easily see this from the number of block dissections performed, this in spite of the fact that a very large number of them have glandular metastases when they are seen for the first time.

As regards the follow-up of my cases, I must admit that at present this is impossible at the J J Hospital for various reasons. Most of the J J patients are so poor that they cannot afford to come repeatedly for the follow-up. Even in my private practice, it has not been possible to follow every case that is treated.

In my cases biopsy has not been done in every case but only in doubtful ones. From the academic and research point of view, I should have done this in every case. I should have labelled them into the various grades of carcinomata, and a corresponding dosage should have been given. One must start the treatment immediately after removing a small piece for section. This could only be

done, if a frozen section report is available in every case. This is not always possible at the two institutions viz the Sir J J Hospital and Sir Harkisandas Hospital, where I am working. I wish to thank the pathological departments at both the institutions for the co-operation that they have given me in spite of all their difficulties. The paraffin section takes at least 3 to 4 days, this means that the treatment is postponed for 4 days after cutting into the growth. It opens up the lymphatic vessels, and hastens the spread of cancer.

You are all aware of the operations devised for the treatment of Carcinoma of the Tongue. Some of my colleagues still hold the view that the ideal treatment is operative. It is not my intention to enter into these discussions now. I will leave that for those who will take part in the discussion.

I am sure you will agree with me, that in those cases in which the primary lesion was in the posterior third of the tongue, operative treatment had nothing to offer. Such cases comprise 2/3 of all the cases of carcinoma of the tongue. In the remaining one third of the cases, what does surgery offer us, except in very early cases which were proved to be malignant only after a biopsy? The ideal surgical operation (Ideal so far as the eradication of disease is concerned) would be the excision of the tongue together with its lymphatic drainage system, in one continuous mass. I doubt, if this has ever been done. I suppose the operation most commonly performed has been a Whitehead's -- removing most of half the tongue from within the mouth and at a subsequent date removing the glandular area on the same side of the neck. This being so, it is perhaps not surprising that the results have been unsatisfactory (They would be in Cancer of the Breast, if at one time we excised the tumour from the breast, and at a later date cleared out the axilla).

On the other hand, if the "Ideal" complete excision of the tongue and its whole drainage area were possible, the extent of the operation, the mortality that would inevitably accompany it and the physical and mental condition of those who survived, would make it impossible of acceptance as the customary procedure. Perfect Surgery of Cancer of the Tongue is perfect only in name - it will never be the perfect treatment.

I do not wish to enlarge on this comparison any more.

In cases referred to me, only the moribund cases and those showing well marked cachexia have been refused treatment.

Frankly advanced cases were treated not with the idea of curing them, but for the following reasons —

To make the primary growth disappear, which will relieve the pain and excessive salivation. To allow him to take the normal nourishment. Even if we can give them a year or two of this relief, I believe it is worth while.

Sometimes cases, which appeared hopeless, have improved so well, that all predictions have gone wrong. In 1933, I saw a patient with a large ulcer practically involving three quarters of the posterior third of the tongue, with severe secondary hæmorrhage. In a weak moment I told his relations that nothing could be done in the way of curing him, but the patient insisted on being treated. He left the hospital markedly relieved. Only his primary growth was treated with radium. He had a small palpable gland in the upper deep cervical group of lymph glands, for which he was advised to come after six weeks for further treatment. I never saw his face till August 1938. He had come to Bombay in connection with his business. As he was in Bombay, he thought of seeing

me, and informing me that he was still alive. He had no symptoms. The tongue was free from any local recurrence and the size of the gland was the same. This has taught me a lesson—never refuse treatment except in markedly cachectic patients—and always give a guarded prognosis.

The reverse of this has also happened. A fairly early case, where I gave a reasonably good prognosis died within two years.

The treatment of Carcinoma of the Tongue is conveniently divided into two stages. The first is the treatment of the primary lesion and the second stage includes treatment of the glandular area in the neck.

Interstitial irradiation with Radium is the method that I have practised in almost all my cases.

The Radium needles used for this purpose contain 1 mgm or 1.5 mgms or 2 mgms of the Radium element. The screening of the needles varies from 0.5 mm to 0.8 mm of platinum, the commonest being 0.6 mm of platinum.

As the majority of the cases have marked oral sepsis, and foul teeth the preliminary extraction of all septic teeth, and control of oral sepsis are absolutely essential before Radium needles are implanted. In the presence of marked oral sepsis, radiation will produce marked oedema of the tongue, and the treatment will have to be abandoned. I beg to differ from Mr Parmar, as regards the role oral sepsis plays in the incidence of Carcinoma of the Tongue. It is very rare to see a Carcinoma of the Tongue with a clean mouth.

If the Wassermann reaction of the blood is positive, and tertiary syphilitic lesions are present in the tongue, antisymphilitic treatment should also be started.

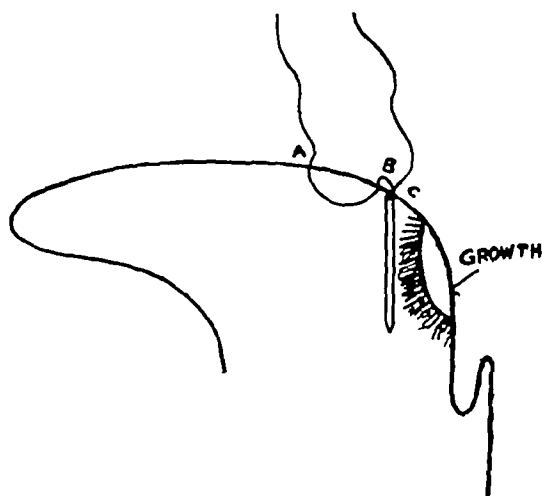
As a rule, general anaesthesia has been used to insert the Radium needles. Instruments for tracheotomy are always kept ready, when a case of lingual carcinoma affecting the posterior third is anaesthetised with a general anaesthetic. I have had to perform an urgent tracheotomy four times for asphyxia, and stoppage of respiration. If a tracheotomy has to be performed, the implantation of needles will have to be postponed till the metal tracheotomy tube is replaced by a rubber one at the end of thirty six hours.

Implantation is easy in the case of lingual carcinoma involving the anterior two thirds of the tongue. The needles are introduced around the growth, the points being inserted into the normal tissue just outside the macroscopic growing edge of the tumour. In order that every part of the tumour should receive a minimum lethal dose without radio-necrosis, it is advisable to use a number of needles arranged in such a way that the irradiation produced in the tumour area is as homogeneous as possible. Multiple foci of low content are therefore preferable, and in order to obtain an even distribution, some should be placed outside the tumour area. If the needles were inserted into the growth itself, and not into the surrounding area as well, the periphery would receive by comparison with the centre of the growth a smaller dose of radiation. Apart from the fact that a more even field of irradiation is obtained by placing the needles well outside the neoplastic area, it must be remembered that in this way the possible danger of dissemination following trauma to a growth is reduced to a minimum.

The interval between each needle should be approximately 1 cm., and the needles should be completely buried, being

kept in position by tying them in pairs

In the case of carcinoma involving the posterior third, two milligramme needles, 4 cms long are used and each needle is sutured in position separately. For suturing, the tonsil needle is found very convenient. Linen thread is the best material to thread the needles with. It was found very difficult in the beginning of my practice to keep these needles completely buried in the tongue for a period of seven to ten days. Since then I have followed the method illustrated below to keep them in position and I have found it very satisfactory.



I have shown in the figure the threads very loose, just to show, that the point at which the Radium needle enters the tongue (C) and the point at which the tonsil needle is introduced & brought out (A & B) to insert the suture are not identical. The needle ends used to come out when the suture was tied, if the suture was introduced through the point (C). A good bite of tongue is necessary so as to include muscle in the suture. The suture should not be tied very tight, otherwise the thread will cut through the tissues, and the needle will become loose. Often the ulcer has extended into the lower pole of the tonsil. In these cases, one or more needles are

inserted through the lower part of the anterior pillar of the fauces also

The time of exposure varies from seven to ten days, varying with the character of the growth and the reaction

The patient is given nasal feeds during this period

He is not allowed to talk. Whatever he wishes to say, he has to put down on paper or on a slate. The mouth and the throat are sprayed with Glycothymoline or Listerine every hour to keep them clean. On the first day the patient requires a strong sedative, and my first preference is for morphia hydrochlorid by injection.

The salivation increases. The pain is also increased. The cough becomes more troublesome. The saliva becomes sticky, and it is difficult to spit out. This excessive salivation, the increase in the pain, and the troublesome cough persist for a week after the Radium needles have been removed. It is always advisable to previously inform the patient of this. On account of the shortage of beds, the patient is discharged from the hospital on the day on which the Radium is removed. He finds, that he leaves the hospital with all his symptoms aggravated. If after going home, he gets into the hands of a quack, the quack will get all the credit of curing him in another eight days to a month, and the radium will be discredited.

When radio necrosis occurs, it is usually due to an overdose in cases which are particularly radio-resistant owing to fibrosis caused by Syphilitic changes, or to previous treatment. The necrotic area is very painful, and tender. The base of the ulcer is covered with a greenish slough, and there is much permarginal oedema and inflammation. Tissue necrosis of this type may follow immediately after treatment in which case the lesion apparently fails to respond.

The gummatous ulcers becoming malignant have shown poor response to radium, and in future I would prefer to treat them by operative measures. This means total glossectomy. The Leucoplakic ulcers which have become malignant require a much smaller dose. Such ulcers become malignant quite frequently.

On the other hand, late necrosis may occur, the lesion remaining healed for two or three months after treatment, and then breaking down without obvious cause. When this occurs it is often extremely difficult to make a differential diagnosis between necrosis and recurrence. In the case of necrosis, healing may occur, if the lesion is kept clean by frequent irrigation, but it may be necessary to excise the whole area with the endothermic knife on account of the distressing pain. The pain usually ceases immediately after such a procedure.

If the growth does not entirely disappear within two months, it should be excised with the diathermy needle, as a residual induration may subsequently be the starting point of a very rapidly growing recurrence.

I have not found it necessary to screen the palate or the alveolar margin with lead.

It is not necessary to give nitrous oxide gas anaesthesia at the time of removal of the needles.

At the time of discharge, each patient is given a card, in which he is informed of the date on which he should come back and show us his progress. He has to come once a week. If the reaction is good, the whole ulcer and the area for $\frac{3}{4}$ of an inch beyond are covered with a dirty yellow membrane, which cannot be removed on rubbing with a piece of gauze.

The after treatment consists of frequent gargles and spraying of the throat.

Only liquid diet is allowed Liver preparations are given by mouth to restore the blood count to normal

Smoking is prohibited, and so is chewing of Betel leaves, tobacco and chunam

If at the end of six weeks, the whole ulcer has not healed up it means that the dosage has been inadequate or that the radiation has not been uniform In such a case, he is readmitted and a second irradiation is given

In the majority of cases, the primary lesion has healed up leaving very little or no scar tissue, depending on the destruction of the tongue tissue by the growth

At the end of four to six weeks after the Radiation, the general health has improved remarkably He is able to eat well His local and referred pains have disappeared Excessive salivation is no more present He no longer requires a sedative The motility of the tongue is restored In quite a number of cases, you cannot say where the original growth was in that tongue

We have now to consider the treatment of the glandular area I am now treading on a dangerous ground Gentlemen, the treatment of the glandular area has been a nightmare to me I do not know the ideal and the safest rule of thumb to deal with this

In 1932, I requested Mr S R Moolgavkar to advise me His prompt reply was that a block dissection should be done in every case, whether the glands were clinically enlarged or not I have performed the block dissection of the lymphatic area in twenty two cases of lingual carcinoma It is evident therefore that in a very small number of cases, I have been able to follow his advice The reasons are varied My friend Mr Parmar has already stated that a very large

number of cases had presented for treatment with inoperable lymphatic glandular enlargement. Anatomically the posterior third of the tongue drains into lymphatic glands on both sides of the neck. Now, in those cases in which there is no clinical enlargement of lymphatic glands, one cannot decide on which side a block dissection should be done Some might argue that in such cases do the block dissection on the same side viz a right sided block dissection if the primary growth is on the right side of the tongue and vice versa Against this, I might bring it to your notice, that I have seen glandular enlargement on the opposite side whilst the affected side showed no glandular enlargement at all This condition has not been in an isolated case or two, but is fairly common

Clinically there are three groups of cases —

- (i) Frankly inoperable cases
- (ii) Palpable glands, clinically operable
- (iii) No palpable lymphatic glands

In a few cases, the group (i) may become group (ii) after the oral sepsis has been brought under control, and the primary growth has healed up This has happened in a few cases In quite a number of cases, the glandular swelling has become smaller after the treatment of the primary growth

With regard to group (iii) in which there are no palpable glands, it should be remembered that in certain cases metastases never occur, or if they do the lymphatic glands have dealt adequately with the malignant emboli It is in these cases, that there is the greatest diversity of opinion as to the method to be adopted The neck may be left untreated, and examined periodically On the other hand, a complete block dissection followed by a surface appli-

cation of radium may be carried out, and each procedure is open to criticism. It is the exception rather than the rule to cure any patient with malignant cervical glands secondary to mouth cancer, whether the method adopted be a block dissection, intensive irradiation, or a combination of both. Any procedure is, therefore, open to criticism, and at the same time, it is an easy matter to argue in favour of any of these methods.

The method I have adopted is open to criticism. A partially expectant attitude is taken. No block dissection is done. Irradiation with deep X Rays is used in the majority of cases on both sides of the neck by the fractional method, and the patient is examined periodically. I would prefer to combine the irradiation with deep X Rays with a Radium collar. This is preferable as the skin is able to tolerate a greater quantity of radiation by combining the two, than by giving the same dose by either method. A further advantage has been pointed out by Ewing, who, studying the histological features of irradiated tumours found that the effect of X Radiation was more marked on the tumour bed, whereas radium produced a greater effect on the cells themselves. As there is no special cancer ward at the J J Hospital, these cases are distributed in various wards, where there is no special arrangement to guard against loss of Radium, this method could not be tried in every case.

In case of group (ii) block dissection of the affected side, followed by deep X Ray therapy has been universally adopted. If at the time of the operation, it is found that a case which clinically belonged to group (ii) is really belonging to group (i) then the whole area is irradiated by the interstitial method.

The endothermic knife is used all throughout the dissection. It has been

surprising to find that the shock has been negligible. Post-operative pain is also negligible. The patients have been able to sit up the day after the operation. Twenty four hours after the operation, no sedatives were required. The wounds heal by primary union leaving a very good scar. There has been no mortality in twenty two operations. The loss of blood during the operation is much less as cut ends of capillaries are sealed by the current. Besides it has a theoretical advantage of sealing small lymphatic vessels, and thus preventing dissemination of the growth.

The intratracheal general anaesthesia with chloroform and oxygen has been used in all the cases.

As regards group (i) cases irradiation with deep X Rays has been used. In a few cases this has been supplemented with a radium collar, and in a few cases with interstitial irradiation.

I hope to be enlightened by you as regards the treatment of the glandular area.

All of us have seen the patients for whom, we can do nothing in the way of even a temporary cure. They are in a miserable state due to the distressing pain—both local and referred—consequent sleeplessness—constant salivation—starvation etc etc.

Resort to sedatives, starting with the mild ones and gradually using the strongest—is the only course left open.

For the relief of pain, Cobra venom has been tried, but it has only partially succeeded in a very few cases.

It is my firm conviction that Euthanasia should be allowed for these human beings.

As regards, deep X Ray contact therapy, I have no personal experience. Six of the patients, whom I had previously seen, went to Berlin, and were treated by Prof Chaul himself. All six died within a period of six months to a year. Two of these cases had very early lingual carcinoma involving the anterior two thirds of the tongue without any clinical involvement of the glandular area. One of them, after 3 months of temporary cure, had a very rapidly growing local recurrence. The other one showed a typical necrosis with oedema of the tongue. She died of starvation and exhaustion from pain. I do not wish to condemn this method, as we cannot judge the results of any method of treatment from six cases. The cases, for which this method is advocated, are the ones which are surface growths. For these growths which are either rodent ulcers, or epitheliomata, Radium has been giving very good results also.

I would like to take this opportunity to thank the various house surgeons and the ward sisters without whose help and co-operation, this treatment could not have been given at the J J Hospital.

SUMMARY--1 Lingual carcinoma is not at all an uncommon disease

2 Chronic irritation in any forms—may it be due to Chronic superficial glossitis, oral sepsis, smoking, chewing of betel leaves, tobacco and chunam, constant application of irritants like 10% solution of chromic acid, tertiary syphilitic lesions—is a strong precursor of Lingual Carcinoma

3 It is quite easy to diagnose these cases early

Digital examination of the posterior third of the tongue is of extreme importance in every patient who has an unexplained

earache, or excessive salivation, or difficulty in swallowing

Examination of the posterior third of the tongue with a laryngeal mirror should never be omitted in any patient who has a throat complaint

4 Importance of early diagnosis —

Any ulcer, any crack, any nodule, any papillomatous growth, any plaque, or any suspicious patch on the tongue should be diagnosed as malignant, till it is proved otherwise by a biopsy report. Any lesion of the tongue which fails to heal or improve as a result of efficient treatment after 3 weeks, should be diagnosed as malignant.

If every medical man, every medical student, and every layman was taught this surgical aphorism, we would be able to see these cases in their early stages. The results of treatment would then be far better.

5 Better co-operation between the general practitioners and the surgeons would bring these cases for treatment in their initial stages, when the disease is still localized to the tongue.

6 Education of the public, which could and should be done by our local health authorities. This part of the problem has so far not interested our health officers, or the City fathers. In every modern country, this is done by serious propaganda through the lay press, by the radio, and by popular lectures. I believe it could be done in India also.

7 Better recording of cases and the facilities for the same are absolutely essential.

8 A close co operation between the

Pathologist, Radiologist and the Surgeon is necessary,

9 Dental hygiene should be given more importance

10 Lingual Carcinoma of the posterior third of the Tongue is certainly far more common than that of the anterior two-thirds

11 The treatment of the primary growth does not present as complicated a problem as that of the glandular area

12 The treatment of the glandular

area is still on controversial ground As a matter of fact, it is the exception rather than the rule to cure any patients with malignant cervical glands secondary to mouth cancer

13 Total number of cases treated are as follows —

(a) Lingual Carcinoma involving the anterior two thirds — 98

(b) Involving the posterior third —

165

Total-263

A DISCUSSION FOLLOWED —

Mr HYDER ALI KHAN, F R C S E (Hyderabad) gave his experience of the treatment of the cancer of the tongue at the Radium Institute at Patna Early cases gave good prognosis It is an established fact that glands on both sides of the neck are being removed in operable stages He mentioned a case of a boy of ten years who had Carcinoma of the tongue

Mr R N COOPER, M S, F R C S (Bombay) was of opinion that carcinoma of the tongue was very common in India The in-patient records of a Hospital do not give

a correct indication of the incidence of this disease Because a large number of cases are far too advanced for any line of treatment and a large number are turned away because of lack of accommodation He stressed the importance of examining the posterior third of the tongue to diagnose the hidden variety of carcinoma arising in a Sulcus of the papillae In the early stages these are difficult to palpate Inspection of the tongue, with the aid of a magnifying lens, after drying the tongue reveals those minor changes in the lining epithelium which are so important for correct diagnosis Palpation of the tongue when properly done

reveals that slight variation in consistency which accompanies a carcinomatous change

He gave the history of a case of early carcinoma of the posterior third of the tongue, which defied detection and in which pain in the throat was an early and a constant symptom. The patient was seen by surgeons here and abroad and the condition was missed until a year after, attention was drawn to the ulcer as the result of a small hamorrhage. He was treated in Europe and died eight months later in Bombay.

In the opinion of the speaker the Nodular variety of tubercular infection may be mistaken for carcinoma. He favoured biopsy by the rapid frozen section method. Diathermy has still its place from the point of view of treatment.

In early cases Radium caused the disappearance of the growth so completely that many patients did not come up for further observation and treatment. Months later they came back with extensive metastases. For block dissection of the cervical glands he employed local anaesthesia. The patients did not seem to suffer from any surgical shock.

He invited the opinion of members on the treatment of cases that have a growth in the tongue with inoperable secondaries in the neck.

Mr M G KINI, M B, M Ch, F R C S E, (Vizagapatam) stated that in Andhra country smoking of local cheroots was responsible for carcinoma of the tongue and palate as the people were accustomed to smoke with the lighted end inside the mouth causing constant irritation with leukoplakia which started malignant changes in the tongue and palate. In an analysis of 335 cases of cancer, 50 cases were carcinoma of the tongue and 52 cases were carcinoma of the palate. The incidence of carcinoma in the anterior 2/3 and posterior 1/3 of the tongue was

equal. Most of the carcinomas admitted were not difficult to diagnose as they were advanced cases. A few cases were treated by Radium and block dissection of glands, but the only case that is alive after five years is a carcinoma of the tongue where diathermy coagulation with block dissection was done.

Dr Mrs KOHLI (Bombay), deplored the poor co-operation between the surgeon and the Radiologist in treating cases of carcinoma. Such co-operation is very essential indeed. She favoured biopsy in every case, to decide what type of tissue we have in the cancer bed, because the treatment is changed accordingly. Local healing of carcinoma brought about by radium or knife is not of much importance. We have to pay attention to the periphery of the carcinoma. Lymph glands are tackled later with xrays or Radium collar. Cancer cells die better by slow irradiation than by stronger doses. Daily exposures to small doses over a longer period is desirable, because the cancer cells are more vulnerable at the pre-karyokinetic stage and the karyokinesis takes place every 24 hours. Whenever Radium needles are applied, they should be used at the periphery. Chaul's is a good method for superficial lesions. The speaker emphasised again the importance of co-operation between the surgeon and the radiologists for treating cases of Carcinoma.

Mr V M KAIKINI, F R C S E (Bombay) related his experiences of operation on 18 cases of carcinoma of the tongue.

Five cases were of carcinoma of posterior 1/3 of the tongue with involvement of the pharynx. Two died on the third and fourth days respectively, after the operation. One case came back with recurrence, two did not report. The lesion was approached through the transhyoid pharyngotomy incision.

Thirteen cases were operated on by him for malignancy of the anterior 2/3 of the

tongue, some with and some without the involvement of the adjacent tissues. In four of these there was involvement of the floor of the mouth, and four had involvement of the mandible. In four cases the carcinoma was confined to the tongue only. One was probably a case of sarcoma. In this there was an enormous swelling of the tongue without much ulceration. The patient died after resection of two thirds of the tongue. Out of all the carcinoma cases those involving the tongue alone gave satisfactory results after operation. Of the eight cases that reported some time after operation three did not show any signs of recurrence, (6 to 18 months after the operation). Four showed recurrence, (In these the floor of the mouth or the mandible was involved). The remaining five cases could not be traced.

He is in favour of operating early on carcinoma of tongue cases, as he has not seen any cases of this disease, which have been permanently cured by radium or deep x-ray treatment. He does these operations under local anaesthesia, as after even an extensive resection of the tongue, there was surprisingly very little shock. Unfortunately the follow up method is not satisfactory at all, as the late results of many of these operations are not available, on account of the majority of the patients failing to report themselves.

Mr R T DESAI, FRCS, DLO (Bombay,) treats on an average 25 cases of Carcinoma of the Tongue every year. In his experience, the patients are as a rule young men between 25 and 55 years. He agreed with Mr Cooper in stressing the importance of examining not only the posterior 1/3 tongue but also to examine the larynx by the indirect laryngoscope. He uses local anaesthesia for the introduction of needles.

Mr K P MODY, D M R E (Bombay) said that he did not agree with the technic

of treating Carcinoma Tongue, by implanting Radium needles in and around the growth. This procedure was painful and caused laceration of the tissues. Modern treatment differed a great deal from that of a few years ago. The important consideration from the point of view of treatment was not the primary focus alone, but also and more so the lymphatic area. He laid great stress on their treatment.

Modern treatment was by external Radiation, by a Radium Bomb or by Deep X-Rays. A thorough course of treatment was given, through different portals, aimed at the primary growth as well as at the Lymphatic area, daily doses being given and the treatment spread over 6 weeks to 2 months. Most of the growth will have disappeared by then, and if a small nodule is left, it can be tackled either by a Radium needle or Radon seeds or by intra-oral application of X-Rays. This latter can be given by the Chaul outfit, called Contact Therapy or by the usual Deep Therapy machine. Chaul is good enough for superficial growths, but with the usual 200 K V, and special intra-oral cones, deep seated effects can easily be secured. Modern scientific achievement has already made it possible to generate X-Rays at a million volts and more, so that intensive treatment of deep seated conditions is easily achieved.

Lastly he referred to block dissection of the neck, which though practised by surgeons in general Hospitals, is passing out of date, especially in Cancer Clinics.

Mr J L DESAI, M B B S, D M R E, (Bombay) stressed upon the importance of co-operation between the surgeon and the Radiologist as suggested by Mrs Kohli. He was of the opinion that a biopsy should be done in every case to impress upon the patient about the diagnosis and secondly it will tell us the kind of cells we have to deal with and find out whether they are radiosensitive.

sitive or otherwise After the line of treatment is chalked out by the co-operation of the surgeon and the radiologist, and the treatment is given, the patient is asked to report every now and then If it is found that the patients do not report as advised every now and then, the speaker went to the extreme of suggesting neglecting these cases Because half-hearted treatment given by the lack of co-operation of the patient, brings the ordinary reliable methods into disrepute Later on he quoted 4-5 personal cases treated by Chaul's superficial contact therapy in combination with Deep X-Ray therapy with the full co-operation of the radiologist, the surgeon and the patient with happy results

Dr WOLFE (Bombay) said that at the present time cancer of the mouth is treated by surgery, radium, radon and X-rays, either by themselves or in combination No one of these agents, alone, gives uniformly good results The use of radium needles implanted in a potentially septic cavity like the mouth is invariably followed by a severe reaction from infection This reaction and the accompanying dangers are avoided by the peroral administration of X-rays as practised at the Memorial Hospital in New York The lesion is irradiated through a special small cone focussed directly on the lesion A periscopic device, incorporated in the cone, permits checking the position of the cone in relation to the lesion Radiation so applied has the additional advantage of giving a much more even distribution

of effective rays than radium needles used interstitially

Mr MOTIBHAI PATEL, FRCS, DLO, (Ahmedabad) did not share the optimism of Mr Mehta about Radium Therapy in cancer Some cases do well, others do not In his experience Radium necrosis was not common in tongue or lip If the patient gets much pain after Radium is implanted into the tongue, he keeps the needles in for 3 days and then he uses it from outside

The President in conclusion emphasized that Carcinoma of the Tongue being such a common disease in India, the co-operation of the Surgeon, Radiologist and Pathologist in all stages of its treatment was most essential Much had been said during the discussion regarding the necessity of Biopsy before and after the commencement of treatment He was personally in favour of Biopsy in all cases, particularly in the earlier ones Regarding the reports, he wished to see laboratories in this country adopt a speedier method by which the surgeon, anxious to begin treating his patient, as well as the patient, anxious to have something done for himself, might be saved waiting, for periods averaging a week to ten days, before a report was received from the pathologist In this connection he had lately been impressed by the almost general adoption of the rapid or freezing method of section-cutting in the course of operations which he saw in use in America and he had been told that accuracy of diagnosis did not suffer materially by the speedier method,

INAUGURAL ADDRESS

Delivered by The Hon'ble Dr M D D Gilder, M D, F R C S, Minister for Public Health
with the Government of Bombay

Ladies and Gentlemen,

I thank you all very much for asking me to inaugurate this first all-India surgical conference. To me it is a matter of great pleasure, as some of you know, I began my own life as a surgeon and I have long been practising the art of surgery myself, and it was with great regret that I have now transferred my allegiance to other matters.

Secondly, it has given me great pleasure, because I have been enabled to get some relief from the toil and turmoil of political activity, and to come back, even for a short period of time, to the good old atmosphere of academic life and to the familiar smells of the hospital and the lecture-room. I may add here that I have always derived great pleasure in recalling to my mind every successful surgical operation which I have had to perform.

Surgery is, as you know, a very ancient art, well known to and largely practised by the Egyptians of old. Confucius of China is also known to have practised surgery. Several eminent leaders of old China were acquainted with the advantages and uses of medicine and surgery. The old leaders of India, among whom prominent mention must be made of Charak and Sushruta, were well aware of the art of surgery. With them surgery was considered to be a very important art beneficial to the human race. Hippocrates was known to have extensively practised the art and trained a large number of disciples.

There are, however, a few people in the surgical world of modern times who criticise these ancient practitioners of the art. Little do these critics remember that these people did not live in the twentieth century but in the good old days. Unfortunately for surgery and for the healing art, humanity had to pass through difficult and strenuous times afterwards.

The field of modern medicine and surgery, as we know and practise it at the present time, does not offer a challenge to the conclusions arrived at by those ancients who made no mistake about what they knew.

Western surgery has certainly travelled a long way, but it has still to take long strides to reach perfection.

This, friends, is the first occasion when the surgeons of India are meeting in conference. I wish them many happy returns of the day. This day of the meeting of surgeons is very appropriate, for to-day is known as Kali Mataji's day.

Bombay accords you, friends, a very warm welcome, and I trust that you will feel yourself at home among the people of this city and the members of the medical profession and exchange a few thoughts with the surgeons of Bombay.

I need not dilate here on the advantages of such a conference when so many of you from distant places meet here at very great personal inconvenience and sacrifice. I trust that this occasion will offer you increased opportunities of knowing one another better, and of exchanging thoughts pertaining to matters of surgical experience.

When I was asked to give this inaugural address I wished to know what I was supposed to do and I was told that I had to give my blessing. I do not know that I have grown so very ancient as to give a blessing. But, since that is the only thing placed at my disposal, I give you my blessing, not as a stranger, but as one of you. My blessing also goes to you on behalf of the Government of Bombay, and in their name do I welcome you to this city which you have chosen as the first venue of your conference. I hope your association will lead in a very short time Indian surgery to its rightful place in the surgical world.

RULES OF THE ASSOCIATION OF SURGEONS OF INDIA

1 TITLE,

The Association shall be called "The Association of the Surgeons of India"

2 AIMS & OBJECTS

The advancement of the science of Surgery and the promotion of social intercourse among the surgeons of India by

- (a) holding scientific discussions and reading of papers on special subjects,
- (b) encouraging research on surgical problems,
- (c) conducting a journal devoted to surgical subjects,
- (d) bringing together members of the surgical profession at least once annually at a conference and in general to work for the betterment of the cause of surgery in India

3 MEMBERSHIP

Shall be of 2 classes --

- (a) Ordinary—open to all medical practitioners registered in India, practising the art of Surgery or otherwise engaged in surgical work such as teaching and research
- (b) Associate---Others engaged in the practice of branches of medical science which are auxiliary to the progress of surgery They will not be entitled to vote at the meeting of the Association

4 SUBSCRIPTION

The annual subscription shall be Rs 10/-- (Ten)

Those who promoted the Association will become "Foundation members" of the Association on payment of the above Subscription before the end of January 1939

Future admission of members will be by nomination by two existing members, the application for membership will be placed before the Governing Body, who shall vote on the eligibility of the candidate

5 GOVERNING BODY

The work of the Association shall be carried on by a Governing Body consisting of twelve members who shall be elected at each Annual General Meeting. Nominations for such elections shall be invited two months before the date of the holding of the Annual General Meeting and the Secretary shall send to every member the ballot papers at least one month before the Annual General Meeting

6 OFFICE BEARERS AND CO-OPTION

Office bearers shall consist of --

- One President
- One Vice-President
- One Hon Treasurer
- One Hon General Secretary

The President shall be elected by the General Body. The newly elected Governing Body shall go into session immediately and elect the other Office bearers for the ensuing year. To facilitate the work of the Association the Treasurer and the Secretary should be from the same town as the President. To enable such an arrangement to be carried out the Governing Body shall have the power to co-opt upto two members. Such co-opted members shall have the rights and privi-

leges identical with those of the elected representatives

The office bearers as well as the ordinary members of the Governing Body shall hold office till the next annual election but they shall be eligible for re-election No member, office bearer or otherwise shall continue in the Governing Body for more than three consecutive years

7 HEAD QUARTERS

The Head quarters of the Association shall be located at the same place as the office bearers

8 DUTIES OF THE OFFICE BEARERS

The newly elected office bearers take over charge from their predecessors at the conclusion of the Annual General Meeting and shall remain in office till the termination of the succeeding Annual General Meeting

The President shall take the Chair at all meetings of the Association and of the Governing Body during his period of office

The Vice-President shall take the place in his absence

The Hon Treasurer shall receive subscriptions and pay all bills and keep and present the accounts to the Governing Body at each of its meeting and also to the Annual General Meeting

9 THE HON GENERAL SECRETARY —

- (a) keep the minutes of all the meetings of the Association
- (b) submit to the Governing Body all applications for membership of the Association duly proposed and seconded and shall maintain an up-to-date list of all the members of the Association-
- (c) summon all meetings of the Governing Body and shall notify all the

members, the place and date of the annual general meeting at least a month before the meeting and at the same time circularising to the members any proposed alteration to the Constitution

10 THE ANNUAL GENERAL MEETING

The Association shall arrange for an Annual Meeting for scientific discussion and other business at a time and date specially provided for the same

Besides an annual general meeting an extra-ordinary general meeting may be called at any time either at the direction of the President or on a requisition signed by 15 members or one-fifth of the members whichever be the smaller number

For scientific discussion, the main subject and the member introducing the subject shall be announced three years previously except for the years 1939—1940 when one and two years notice only respectively may be given Subsidiary subjects may also be discussed with shorter notice The main subjects shall be decided upon at the Annual General Meeting The Introducer of the Subsidiary subject shall not take more than half an hour others contributing to the discussion not being allowed more than ten minutes

The Annual General Meeting shall determine the venue of next annual meeting A Local Reception Committee shall be formed which shall look after all the affairs of the Annual Meeting The meeting shall be presided over by the President of the Association

The papers read and discussed at the Annual Meeting shall be the property of the Association of the Surgeons of India and shall be published in the Journal of the Association

11 THE JOURNAL

The Association shall conduct a Journal styled "The Indian Journal of Surgery" to be published quarterly. The control of the Journal shall be by an Editorial Board consisting of

One Chairman

Two Joint Editors

Members - not exceeding twelve

This Board shall frame their own rules for the conduct of the Journal. The office of the Editorial Board and Journal shall be located in Bombay.

The subscription for the Journal for the member will be Rs 8/- and for non-members Rs 10/- annually.

12 AMENDMENTS TO CONSTITUTION

Notices of motion aiming at amending, repealing or making fresh rules relative to the constitution shall be sent to the Secretary at least 2 months prior to the Annual General Meeting and these shall be circulated by the Secretary for the information of the members at least a month prior to the meeting.

The Funds of the Association shall be kept in the name of the Association at a scheduled Bank to be selected by the Governing Body and the account shall be operated conjointly by the following office bearers:

(1) President.

(2) Hon Treasurer

Cash in hand with the Hon Treasurer shall not exceed Rs 50

The following Gentlemen have been elected to work on the

GOVERNING BODY FOR THE YEAR 1938-39

PRESIDENT

Col K. G. PANDALAI, (Madras)

VICE-PRESIDENT

Mr R. N. COOPER, (Bombay)

TREASURER

Mr S. K. MENON, (Madras)

HON SECRETARY

Mr C. P. V. MENON (Madras)

MEMBERS,

Mr S. B. GADGIL, (Bombay)

Mr S. SUBBA RAO, (Bangalore)

Mr N. C. JOSHIE, (New Dehli)

Mr M. G. KINI, (Vizagapatam)

Mr H. HYDER ALI KHAN, (Hyderabad,
Deccan)

Major D. P. BHARGAVA, (Patna)

Mr V. P. SINHA, (Patna)

Mr T. O. SHAH, (Bombay)

शौर्यमाशुक्रिया तीक्ष्णं शस्त्रमस्वेदवेपथुः ।
असंमोहश्च वैद्यस्य शस्त्रकर्मणि शस्यते ॥

—वाग्भट

Courage, quick action, sharp instruments,
absence of perspiration, absence of trembling
and a clear intellect—these are qualities
which are praiseworthy in a Surgeon.

—Vagbhat

العلم علمان علم الأبدان و علم الأديان

Knowledge is of two kinds one pertaining
to the body and the other to religion.

—Old Tradition

The following Gentlemen have been elected to work on the

EDITORIAL BOARD

CHAIRMAN

Col K G PANDALAI, (Madras)

JOINT EDITORS

Mr S R MOOLGAVKAR, (Bombay)

Mr V L PARMAR, (Bombay)

MEMBERS

Mr N C JOSHIE, (New Delhi)

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Rai Bahadur Capt K S NIGAM, (Lucknow)

Dr KHURSHED HUSAIN, (Hyderabad
Deccan)

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Indian Journal of Surgery

Vol. I]

JULY 1939

[No. II

EDITORIAL

We must first foremost tender our apologies for the late publication of this number of the journal. Two factors have contributed to this end. Firstly the editor in charge of the issue was seriously ill for a prolonged period and secondly sufficient material could not be collected to have an issue of fifty pages. The present number of the journal therefore contains only forty pages. We earnestly request our fellow members to think of the journal often and send in interesting case notes and papers on observations and analyses they have made. Without such material it is impossible to have a body to the journal. We can always collect and quote abstracts from foreign journals but the idea of having an "Indian Journal of Surgery" is not that of collecting abstracts and printing them but to give voice to the thoughts of Indian Surgeons. As was pointed out in the first issue it is quite possible that members feel very diffident about writing papers, particularly when we consider under what difficulties they have to work. But this should not discourage them from sending in their observations. Talking of difficulties it often happens that certain investigations cannot be carried out for lack of reagents. It is indeed a shame that when there are workers ready to devote time and energy for research and investigations, their work should be hampered and rendered incomplete by such a thing as "Lack of reagents". Such things must be brought to the notice not only of the

people who control the finances of a hospital but also to that of the public. Apart from this, the question of proper filing and indexing of Hospital case notes as well as the follow up of such cases must be insisted on till proper action is taken.

We need not dilate here on the two papers that are published in this number. Miss Jhirad's careful and illuminating observations on 134 cases of Ectopic Gestation and Capt. Nigam's painstaking and complete analyses of 18 cases of Gall Bladder disease in Lucknow need no comment from us. Let us hope that the perusal of these papers will stimulate other members to send in their observations and analyses. That there are many interesting cases in India can easily be seen by the few reports that have been published in this number. Let us hope that such records will be sent to us in increasing numbers. Lastly two abstracts sent in by Messers M. V. Bhajekar and D. R. Bharucha have been included. Our thanks are due to Miss Jhirad and to all those gentlemen who have sent in contributions without which it would have been impossible to publish this number.

It is our most unpleasant task to record the death of Mr. N. B. Fadia, F.R.C.S., of Surat, a member of our association, who passed away on 19-4-1939 as a result of Cellulitis of the thigh at the early age of 36. We lose thus an enthusiastic and earnest worker.

ABSTRACT

Prothrombin Deficiency and the effects of Vitamin K in obstructive jaundice and biliary fistula
by John D Stewart, M D -Annals of Surgery April 1939

In 1935 Dam found that the lack of a fat-soluble substance vitamin K (Koagulatory Vitamin) in the diet of chicks caused fatal bleeding. Investigation of certain haemorrhagic diseases of cattle due to eating of spoiled sweet-clover led to the discovery of low plasma prothrombin as the cause. Similar low plasma prothrombin levels were found in experimental liver poisoning accompanied by biliary obstruction and in patients with obstructive jaundice. It was later found that fat-soluble vitamins are not absorbed from the intestine in the absence of bile salts.

For the present study vitamin K was prepared from fresh spinach. One gramme of the spinach extract was mixed with 4.5 grammes of sodium taurocholate and sodium glycocholate. Of this mixture 0.2 grammes was placed in a capsule.

Twelve patients suffering from obstructive jaundice due to obstruction of the common bile duct by a stone or carcinoma of the head of the pancreas and one patient with post-operative biliary fistula were investigated. Plasma prothrombin percentages before and after treatment with vitamin-K and bile salts were estimated in these thirteen patients before operation. The average duration of treatment was 39 days and the average dose was 6.8 gms of vitamin K-bile salts mixture. The average plasma prothrombin percentage before treatment was 53.4 and after treatment 86.2 i.e. an average gain of 32.8 percent. The greater the liver damage the lesser was the response to the treatment.

It was at once evident from this investigation that in cases of obstructive jaundice plasma prothrombin is markedly reduced in a very large proportion of cases. Later when these thirteen cases were operated an average drop of 20 to 40 percent in plasma prothrombin was noticed. This decrease is only transitory if treatment with vitamin K-

cholic acid combination is recommenced at once. From the point of view of haemorrhage a safe preoperative level of plasma prothrombin is 75 per cent or over. As prothrombin percentage changes rapidly, frequent estimations during the first few days after operation are necessary.

Of these thirteen cases five developed post-operative haemorrhage. Four of them had high and satisfactory preoperative plasma prothrombin percentage. After operation two did not receive the vitamin K capsules as it caused epigastric distress. The fifth developed diarrhoea on exhibition of the vitamin-K capsules. The result was that in all of them the prothrombin percentage fell below 45 and resulted in large haemorrhage. In three patients including the two who had previously refused the drug—immediately on the administration of vitamin-K cholic acid capsules the prothrombin percentage rose and the bleeding stopped dramatically. In one of the three the drug was given by jejunostomy. The same patient had had six blood transfusions to stop the bleeding without success. Two of the five patients died. One was not given the vitamin K capsules as he was considered too moribund and hopeless. The other could not tolerate the drug as it caused diarrhoea.

Intercurrent infections like post-operative pneumonia cause a fall in prothrombin level. Another interesting point brought out is that blood-transfusion is inefficient in checking bleeding when the plasma prothrombin level is low. Four of the five patients with post-operative haemorrhage had one or more transfusions without any appreciable effect.

Plasma prothrombin formation depends upon liver function and vitamin K intake.

REPORT ON TWO RENAL CASES.

by

Mr N Mangesh Rao, M B C M, F R C S E Surgeon, General Hospital, Madras

and

P K Duraiswami, M B, B S House Surgeon, General Hospital

A Case of Bilateral Renal Stones, Double Ureters on the left and Bifurcated Ureter on the right.

A Hindu male aged about 49 years was admitted on 30-6-38 under N M R complaining of pyuria with a trace of blood

PREVIOUS HISTORY —Patient noticed cloudiness of the urine about four years ago B Coli was isolated from the urine and he was treated with mandalates and auto-vaccines Urine never cleared up in spite of prolonged treatment. He had several attacks of fever On 28th of May he had fever for a week with cloudy urine and blood was present for the first time This continued till the date of admission

CONDITION ON ADMISSION—A tall rather heavily built man of middle age, slightly anaemic but otherwise in a fairly good general condition

ON EXAMINATION —A definite tumour of the size of a coconut could be made out in the right flank, which the patient had never noticed The upper border of the tumour lay an inch and a half below the costal margin in the nipple line and the lower border reached the iliac fossa Anteriorly it reached a line one finger to the right of the umbilicus It was fairly firm A band of resonance separated it from the liver dullness The dullness over the tumour extended to the outer border of erector spinae muscles posteriorly Though the tumour appeared to be of renal origin, it did not move with respiration probably due to adhesions A certain

amount of pain and tenderness could be elicited in its upper part

On the left side the kidney was palpable at its lower pole on deep inspiration and was slightly tender to pressure

B P 102/65 Heart sounds were rather soft

Urine was cloudy,
Albumen +
R B C s +
Pus cells +
Phosphates +

Urea Clearance —

Blood Urea 23.5 mgms Per cent
Urine Urea 1.253 Per cent
Urine Vol 0.5833 Per minute
Percentage of normal—75.04

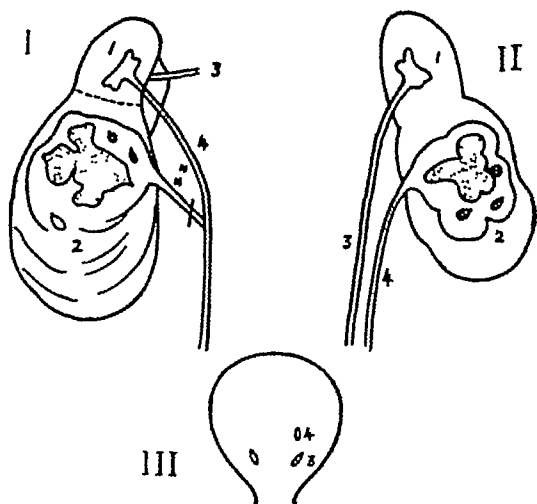
ROENTGENOLOGICAL EXAMINATIONS —
A plain picture showed the presence of giant stones in both kidneys Lungs were clear

EXCRETION PYELOGRAPHY —This indicated a clear upper calyx on the right immediately above the shadow of stone Two ureters were suspected on the left The upper pelvis was well seen and the giant stone was apparently in the lower pelvis Cystoscopy by N M R on 8th July —Flow of thick pus was noticed from the right ureteral opening On the left two ureteral openings about a centimeter apart were seen The efflux from the upper was cloudy but that from the lower was clear Indigo carmine was excreted in 7 minutes through the left lower opening but not from the others

Catheters were passed up the three ureters and retrograde pyelograms were done



A study of all the pictures made one suspect a bifurcated ureter on the right and double ureters on the left and that the left, lower opening in the bladder was that of the ureter from the upper half of the left kidney. This is explained in the following diagram



I RIGHT KIDNEY

1 Portion left after heminephrectomy 2 Tumour portion

with stones and caseous material supplied by a tiny artery 3 Renal Artery 4 The Bifurcated right ureter

II LEFT KIDNEY

1 Healthy part 2 Calculous pyo-nephrosis 3 & 4 Two separate left ureters

III BLADDER

3 & 4 Correspond to ureters 3 & 4 of the Left Kidney

Operation on 21-7-38 (by N M R) under spinal anaesthesia supplemented with C E mixture at the end

The tumour was exposed by a curved lumbar incision. The enormously enlarged lower pole of right kidney extending into the iliac fossa felt like a bag of necrotic material of cheesy consistency as nothing would come through a canula of small bore. The sac was cut into and the necrotic material scooped out, thus facilitating the delivery of the whole kidney. There was no sign of any bleeding and three large stones came out with it. The upper pole of the kidney about half the size of a normal kidney was healthy and had a separate pedicle and pelvis. Its ureter was traced downwards. It joined the ureter from the lower half at the level of third lumbar vertebra. The ureter of the lower half was about two inches long. It was ligated one centimeter from the main one and severed. There was no sign of any vascular pedicle to this part. A heminephrectomy was easily performed, cutting through half an inch proximal to the lower border of the healthy part, while the vascular pedicle was controlled by finger pressure of the assistant. A tiny artery passing down to the necrotic part was caught and ligatured. The cut edge was closed by mattress sutures and interrupted sutures over a graft of peri-renal fat. A large piece of perirenal fascia was used to cover this retained portion of the kidney and held in place by three pieces of catgut tied longitudinally as over a packing. The resected part had a separate dilated pelvis and a small ureter and the tiny artery mentioned above. The wound was closed in layers with a drain leading to the renal fossa.

The patient was given one pint of gum saline, 100 ccs of 25% glucose and 20 ccs of 10% Calcium Gluconate intravenously during the operation. He left the theatre with a B P of 112/70. His temperature rose to 103°F in the afternoon but came down to normal at 8 P M.

Next day his temperature was 100°F, pulse 110, B P 80/65 in the morning and he had passed 18 ounces of blood stained urine. In the evening his temperature rose to 101.6°F and pulse to 155 and B P fell to 70/50. As there was a fair amount of oozing of blood in the dressings he was taken to the theatre at 11-30 P M. The wound was opened up and a small amount of clot evacuated. There was no bleeding from the kidney, one or two suspicious spots in the muscles were ligatured and the wound closed in layers round a drainage tube and a small gauze pack. He was again given a pint of gum saline with 50 ccs of glucose and 20 ccs of calcium gluconate. His blood pressure rose to 100/60.

On the 23rd his temperature varied between 101.2°F to 99.6°F and pulse rate between 110 to 120. He passed 36 ounces of urine with only a slight trace of blood. On the 24th his temperature came down to normal and pulse varied between 100 to 90. The drainage tube and pack were withdrawn on the 25th. Sutures were removed on the 3rd of August. The portion of wound with drain and pack took some time to heal. By the end of August it had healed completely.

On microscopic examination of sections from the resected part a suspicion of malignant change arose. He was therefore given two courses of deep X-ray therapy.

Blood examination on the 23rd August showed 3.86 million R B C's and 72 per cent haemoglobin.

One course of twelve exposures of

deep X-rays was given from 24-8-38 to 19-9-38.

Blood examination on 1st October showed 4.62 million R B C's and 82 per cent haemoglobin. A second course of deep X-rays was given from 2nd to 26th October.

His urine was free of blood and albumen but contained some pus cells and R B C's.

The patient was given large doses of iron by mouth and injections of Campolon during this treatment.

His urea clearance on 5-8-38 was —

Blood urea	27 m gms per cent
Urine urea	0.819 " "
Urine volume	0.888 ccs per minute

Percentage of Normal 52.79

On 7-8-38 excretion pyelograms were done. But the pictures were not satisfactory and only the upper half of left kidney was visualised.

On the first of November cystoscopy was done. Efflux from right ureter was clear. Indigo carmine was given intramuscularly as no veins prominent enough for intravenous injection were available. The dye was not excreted for twenty minutes on either side. Catheters were passed into the ureters of left kidney only and a pyelogram was done.

The patient was discharged on 4th of November with the advice to return three months later for operation on the left kidney for stone. His wound had completely healed and his weight had gone up from 132 lbs to 152 lbs at the time of discharge. Further report on this case will be published when the patient returns for further treatment.

A case of Hypernephroma with a calcified guinea-worm surrounding it.

A Mohammadan male aged about 48 years was admitted under N M R on 13-7-38 for haematuria of three years' duration

HISTORY—He had painless haematuria in 1935 lasting for a week. It recurred after some months and persisted for a month. Since then he had haematuria on and off. A year ago he noticed a lump in his left loin. It had grown more rapidly in the last few months and has been painful & tender for the last two months.

PRESENT HISTORY—A fairly well built man of middle age, slightly anaemic but otherwise healthy.

A solid tumour of the size of a small husked coconut, firm in consistency and tender on pressure was present in the left lumbar region. Its upper margin extended to an inch below the left costal arch in the nipple line, anteriorly to the umbilicus, below as far as three inches above the inguinal region and posteriorly to the border of the erector spinae muscles. The surface of the tumour was smooth. A band of resonance was noted on its antero-medial aspect but not posteriorly. Fingers could be dipped between the tumour and the costal arch. It moved slightly with respiration.

His other systems were normal and B P was 115/70.

Urine examination—Albumen +, no sugar, R B Cs +, leucocytes +, no other cells found.

Plain X-ray pictures—Lungs were clear. A shadow of a tumour encircled by a calcified guinea worm was noted in the left renal region.

Excretion pyelograms—No visualisation of left renal pelvis or calyces. A definite tumour shadow at the lower pole of left

kidney encircled as it were by the shadow of a calcified guinea worm. Right kidney is functioning normally.

Urea clearance test—

Blood urea 27 mgm per cent
Urine urea 0.5292 per cent
Urine volume 1.8 C Cs per minute
Per centage of normal 50

Blood examination—R B Cs 4.07 millions, Haemoglobin 85 per cent.

Deep X-ray therapy—Three exposures from 20-7 to 25-7-38.

Operation on 26th July (by N M R) under spinal anaesthesia.

The tumour was exposed by a curved lumbar incision and the outer one and a quarter inches of the twelfth rib was resected. The peritoneum was very adherent to the peri-renal fascia in some places probably due to the inflammation caused by the presence of the guinea worm. The peritoneum was torn in a couple of places while separating it, but the rents were closed with catgut sutures. The kidney pedicle was isolated from behind as well as in front and clamped with two clamps and then severed. Two large veins had to be separately clamped in the upper part. At the lower pole along the ureter a couple of vessels had to be clamped. Finally the ureter was ligatured as low down as possible and severed. The kidney with the growth was removed. The vascular pedicle was ligatured in two lots with double ligatures. After arresting all bleeding and the usual toilet of the wound, it was closed in layers with a drainage tube. The patient was given one pint of gum saline, 50 c cs of 25% glucose and 20 c cs of 10% calcium gluconate intra-venously. His blood pressure

was 120/90 when leaving the theatre

Fortunately the growth had not extended into the renal veins His temperature varied between 101°F to 99°F and pulse rate between 130 to 100 From the 28th his temperature remained normal and the drainage tube was removed on that day Sutures were removed on the 12th day after operation Convalescence was uneventful

Blood examination on 16th August—
R B Cs-4 87 millions, haemoglobin-90%.

better condition than on admission and with the wound soundly healed

The tumour was reported on as Hypernephroma by the Pathologist

Comment--This is a rare case of a calcified guinea worm being found surrounding a renal tumour X-ray picture of the tumour after removal shows the worm to be in the capsule of the tumour



Deep X-ray therapy to the lungs and left renal fossa--14 exposures between 18th August to 4th September--was given He was discharged on the 5th September in a

We are obliged to the Staff of the Barnard Institute of Radiology for the pictures.

SEQUELAE OF OSTEOMYELITIS AND TREATMENT OF PATHOLOGICAL FRACTURE WITH NON-UNION.

by

Mr M G Kini, M C, M B, M. Ch. (Orth), F. R C. S E, Surgeon

and

Dr. P Kesavaswami, Radiologist, King George Hospital, Vizagapatam (S India).

In India bone infection is very common. Like other infections in the human body osteomyelitis of bone occurs in the young as well as in the old, and the average age when infection occurred in a series of 120 cases was 6 years in children. Most of the cases sought admission in a General Hospital after the acute stage, with a discharging sinus and in a poor general condition.

diaphysial type are found in very serious infections, with very little attempt at new bone formation. The treatment of this condition becomes a problem when there is a pathological fracture with non-union between the two ends of the bone. The result of such a disaster is a deformity with a flail limb. In some cases where the infection is not very severe, the damage to the bone is not great, but there is inter-



Fig 1

The most common sequela of osteomyelitis is the development of big or small sequestra. Very often, sequestra of the

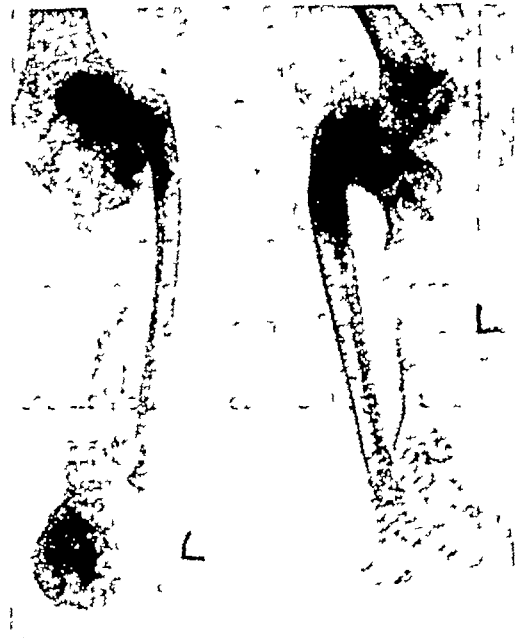


Fig 2

ference with the growth of the bone resulting in a deformity. In limbs where there are parallel bones as in the case of the forearm and the leg, if the arrest in the growth of the bone occurs in both bones then the limb as a whole is

shorter with slight deformity (Fig 3 & 4) But if one of the bones is pathologically fractured or arrested in growth then the unaffected bone grows in length and owing to the loss of parallelism and arrest in the growth of one bone the concavity of the bend occurs towards the affected bone resulting in an ugly deformity (Figs 1 & 2)

Similar results follow infections in small-pox where associated with the arrest of growth and of the formation of sequestra there is also infective arthritis with ankylosis and deformity (Fig 5 & 6)



Fig 3

In four cases there was a stimulation of growth which resulted in an increase in length of the bone with deformity. In some cases where the metaphysis of the bone is intra capsular as in the case of the upper end of the femur, there occurs an arthritis with pathological dislocation

There were three such cases of hip joint dislocation. Formation of a Brodie's abscess, though it is not common, occurred in 4 cases in the series. The following cases illustrate two of the many aspects of the sequelae mentioned above —

Case illustrating extensive necrosis forming a diaphysial type of sequestrum resulting in a deformed leg due to non-union after pathological fracture

A Mahammadan girl aged 8 years was admitted in 1934 with a history of fever and swelling of the left leg which was operated outside, with foul smelling discharging sinuses of 5 months' duration. On admission, she was found to be very poorly

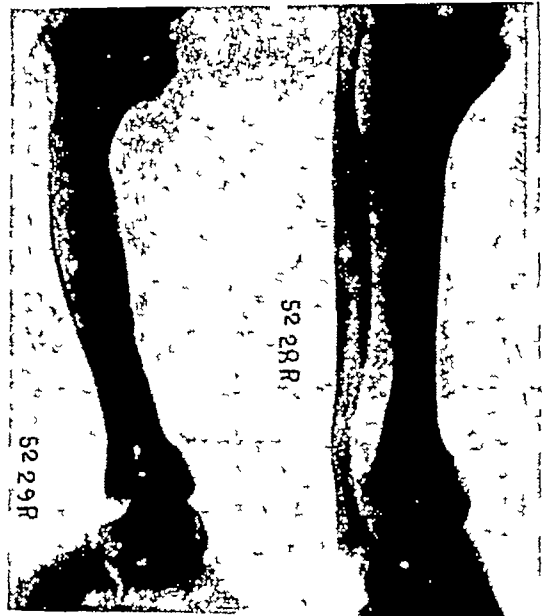


Fig 4

nourished with discharging sinuses leading to a dead bone underneath. A sequestrum of a diaphysial type was removed. The involucrum in this case being very thin there was a fear of a pathological fracture. The wound was freely drained and put in plaster and treated on the Winnet-Orr Lines. It

took nearly 3 months for the wound to heal and re-X-Ray showed very slight new bone formation joining the two ends of the bone. The patient's father was warned not to allow weight bearing on that leg for 3 months from the date of discharge. She was fitted up with a walking caliper and sent home. In 1937 the child was readmitted for marked deformity and flail club leg with no union between the two ends of the tibia and marked hypertrophy and lengthening of the fibula. The shortening was $4\frac{1}{2}$ inches on account of the arrest in the growth of the

The medial side was not preferred because it was physiologically unsound for a bone graft, as the existence of dense scar tissue due to old suppuration made it very unsuitable, though it was the easier route. The wound was sutured in layers and put in plaster. The graft after 2 months showed signs of regeneration and the shape of the fibula adjusted itself to the required function. She was allowed weight bearing 4 months after operation with a compensatory boot and is now perfectly happy with regard to weight bearing and reports that she can walk long distances.



Fig 5

bone. To get a firm weight bearing leg a bone graft was done utilising a portion of the neighbouring tibia as a graft. The required length was removed sub-periosteally and with very great difficulty the graft was inserted between the two ends of the tibia after they were freshened, through the lateral side between the muscles of the anterior and lateral compartment of leg without injuring the nerves or blood vessels.

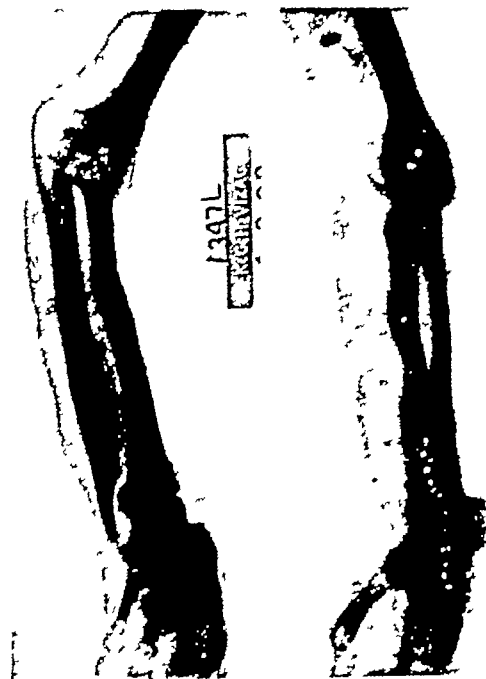


Fig 6

(B) Case illustrating arrest in the growth of both bones

A Hindu male aged 10 years was admitted for an acute pain in 1938 in the right iliac fossa of 10 days' duration. He was operated for perforated appendicitis and recovered. On examination his right leg showed a club shaped deformity with marked

shortening of the leg ($4\frac{1}{2}$ inches) This was the result of an old osteomyelitis when he was young as a child of 3 years (Fig 3)



Fig 7

In this case the weight bearing was very good though the leg was short and the patient was quite happy with-

out any artificial aid to restore the length of the limb, even though he walked quite lame

POINTS OF INTEREST

Of all the sequelae of osteomyelitis a pathological fracture with non-union is the most serious especially in a weight bearing limb. It is a difficult problem to deal with this condition. Amputation, in very bad cases, is an operation of choice in flail limbs. Bone graft which after fusion restores the continuity of the bone, serves the purpose of stabilising the limb for weight bearing though with shortening of the limb. The first case illustrates the usefulness of bone graft in restoring the weight bearing capacity of the limb though shortened. Is it possible that there may be an increase in the length of the limb due to fusion of the graft to the fibula at the lower end, the fibular growth having not been interfered with. Will the graft grow with the fibula and thus help in the lengthening of the limb? The case is watched with keen interest. The second case illustrates that in spite of the shortening, the patient is happy to walk on his own controllable leg though with a limp. It is better than any artificial leg more so in poor Indian patients who cannot afford the purchase of a suitable artificial leg.

ECTOPIC GESTATION

A review of 134 consecutive cases.

By—Dr Miss J Jhirad, M D, B S (London)

Ectopic gestation forms one of the most fascinating subjects in Gynaecology, and its aetiology, symptomatology, and morbid anatomy present most interesting problems. In the present article an attempt is made to elucidate some of the out-standing features of this condition, and give an idea of the particular factors which are most commonly present, as also the common fallacies in diagnosis. A well developed case with the dramatic onset of acute signs and symptoms is easy enough to diagnose, but this type is among the rarer forms, the commonest being the sub-acute type with features so variable and confusing that even experts have at times felt baffled.

The ordinary text-book description gives an erroneous idea to the beginner, as, I repeat, such acute cases are fortunately very rare. It is to disillusion oneself that this investigation was undertaken, as also to give a more lucid account of the type usually met

with. Munro Kerr (1) groups his cases into four types and emphasises the fact that cases belonging to group 2 viz—"The woman suffers for some time from abdominal uneasiness, pain, occasional faintings and haemorrhagic vaginal discharge" are much the most numerous.

The symptoms depend on certain factors—

THE SITE OF GESTATION,

Tubal gestation being the commonest, reference to other forms is omitted unless specially mentioned. Isthmial pregnancy is commonly followed by acute symptoms. Ampullary gestation usually has sub-acute symptoms. In this series there were 56 ampullary, 29 isthmial and 1 interstitial.

Table I gives a detailed idea of the site of ectopic gestation, showing up a comparison in the frequency of right and left-side implantation and the type of termination.

TABLE I TOTAL CASES 134

Site	Abortion		Rupture		Unruptured		Total		Grand Total	Remarks
	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt		
Ampullary	15	13	13	14	1	-	29	27	56	Unrup tube had twins 3½ Mths size
Isthmial	5	2	9	13	-	-	14	15	29	
Interstitial	-	-	1	-	-	-	1	-	1	
Ovarian	-	-	2	-	-	-	2	-	2	
Rud Horn	-	-	-	-	-	1	-	1	1	
Unclassified	15	11	8	8	-	-	23	19	42	1 bilateral
2ndry abd	-	-	-	-	2	1	2	1	3	1F T Lithopaedion

N B Haematocoele 1 case

Woo (2) reviewing 54 cases from China found that of 24 cases which could be classified as to site, ampullary gestation was twice as common as isthmal. The right side was affected in 18 cases as against 12 on the left side. Belmey (3) found ampullary gestation much the commonest. Leith Murray (4) reporting 146 cases found ampullary pregnancy in 70.5%. In his series also the right side was more frequently affected. In our series right sided gestation seems a little commoner, but the difference is not marked including the unclassified cases and a haematocoele. Ampullary gestation accounted for 60.8% of cases as against

true to term as such, or more frequently turn into secondary abdominal pregnancy, with passing symptoms hardly noticed by the patient. More than 50% ectopics terminate within the first seven weeks. The following table gives the term for the present series.

The term is calculated by the history of the period of amenorrhoea and often verified by the size of the embryo, if detected.

THE TYPE OF TERMINATION, whether abortion or rupture, often decides the severity of the symptoms. It must however, be

TABLE II TOTAL CASES 134

Term	Abortion	Rupture	Haematocoele	Unrup	2ndry abd	Ovarian	Total	Remarks
5-7 weeks	25	30	1	-	-	1	57	
8-10 weeks	15	16	-	-	-	1	32	1 bilateral
11-14 weeks	4	7	-	1	-	-	12	
4 months	1	2	-	-	2	-	5	
6 months	-	-	-	1	-	-	1	Rud horn
F T	-	-	-	-	1	-	1	8 Yrs duration
No amen	16	11	-	-	-	-	27	
	61	66	1	2	3	2	135	1 bilateral
N B Amenorrhoea of variable duration					107			
No history of amenorrhoea					27			
					134 cases			

31.6% of isthmal pregnancy

2 THE TERM OF GESTATION

Most ectopics terminate within the first three months. Belmey (3) also emphasises this point. Once the gestation has passed the third month, it may occasionally con-

remembered that the so-called tubal abortion is usually an intra-tubal rupture and may be accompanied by as much free bleeding as an extra-tubal rupture, and vice versa, the latter may often be a slow leakage. The termination in this series is illustrated in Table II above.

The following table shows the lesion in cases with severe onset

Table III CASES WITH ACUTE ONSET

Main symptom	Abortion	Rupture
Acute pain (at times fainting)	19	35

It will be seen that rupture is almost twice as frequent in acute cases, whereas rupture and abortion are, about equal in frequency in the whole series. Woo (2) found the incidence of abortion versus rupture as 10:22. Dougal (5) reviewing 100 cases found rupture in 37% and abortion in 52% cases. 80% of his cases had formed a mole. Echols (6) thought abortion was four times as common as rupture.

A reference to table I will also reveal the fact that in the cases which could be classified as to site of gestation, rupture was proportionately the commoner termination in Isthmial pregnancy.

The present series brings out some other interesting facts

PAST HISTORY PARITY

Table IV Parity,

Parity	0	I	II	III	IV	No ^a men- tioned	Total
No of cases	24	27	22	19	35	7	134
Per-centage	17.91	20.11	16.42	14.23	26.11	5.22	100

It will be noticed that quite a large proportion (17.91%) occurred in nulliparae as also in those with one, two or three preceding pregnancies (50.76%). Of these (68 cases) only seven were preceded by abortions. One had an abortion and a premature, and four were preceded by tubal gestation, leaving 56 which followed after full term labours. Of the nulliparous group, some, but comparatively few, had abortions and prematures. Most of the cases were preceded by full-term labours. Stamm (7) reviewing 116 cases found 81% multiparae, 27% of his cases had had previous abortions. Fitzgerald (8) and Brewer in 500 cases found 27.4% of cases had no full-term deliveries, and 64% cases who had two babies or less.

INTERVAL SINCE LAST PREGNANCY

34 cases had an interval of five years and upwards, of nulliparae only seven had been married more than five years, and one had been married only three and a half months—37 cases conceived in two years or less. In 18 cases the date of last pregnancy is not mentioned.

TABLE V INTERVAL SINCE LAST PREGNANCY

Years	Under 1	1-2	2-4	5-7	8-10	11-13	15	17	Not mentioned	Total	Nullip	Grand Total
No	7	30	21	14	12	5	2	1	18	110	24	134

In Fitzgerald and Brewer's (8) series of 500 cases more than half the cases had an interval of three years or less.

TABLE VI INCIDENCE PER AGE GROUP

Years	15-20	21-25	26-30	31-35	36-40	42	Not mentioned	Total
No	25	32	39	29	5	1	3	134
Percentage	18.66	23.88	29.10	29.64	3.73	75	2.24	100%

71 or 52.98% were between 20 and 30, the most fertile period in the reproductive life although the age groups 15-20 and 31-35 run almost parallel. There was one case at 16, and one at 42. Leith Murray (4) in his series of 146 cases got an average age of 30.5. His youngest patient was 20 and the oldest 42. Echols (6) found the greatest frequency between 25-35.

MENSTRUAL HISTORY

17 were definitely irregular, in 29 cases the statement of the history is not definite. The rest (92 cases) were regular before the onset of the tubal gestation.

Belmy (3) refers to a high proportion of ante-flexed uterus and irregular delayed periods suggestive of frequent association with genital hypoplasia.

SYMPTOMS

The commonest history is that of a variable period of amenorrhoea followed by pain and bleeding. According to Munro Kerr (1), pain and discomfort are the earliest symptoms, the haemorrhagic discharge following some time later. In the present series it was noticed that bleeding and pain were quite commonly associated together as the first symptom, quite a number of patients describing it as an unusually late and painful period.

A history of Amenorrhoea of a few weeks in a patient who was always regular, followed by a so-called painful and prolonged period in one who was used to painless periods, is very suggestive of an ectopic

In this series 107 cases or about 80% had amenorrhoea of variable duration, 27 cases had no preceding amenorrhoea (Refer Table II). Woo (2) reported 63.7% of cases with history of amenorrhoea in his series of 54.

PAIN varies in intensity and type. The pain of acute rupture is distinctive. In sub-acute cases two types are generally recognised as pathognomonic of the changes occurring within. The colicky type, coming on in spasms, is suggestive of distension of the tube and attempts on its part to contract down on to the contents, the dull gnawing pain is usually the result of slow leakage into the peritoneal cavity leading to peritoneal irritation, and later to adhesions. In this series, pain as a first symptom with or without bleeding or fainting was present in 108 cases (about 80%). In Woo's (2) series 90.9% had pain. It may be mentioned however that pain has followed sooner or later in the rest of our cases and has often been the symptom which has brought the case under observation. In Dougal's (5) review of 100 cases, pain was absent in only 3%.

Table VII FIRST SYMPTOM IN THE SERIES,

Symptom	No	Remarks,
Abd Pain only	40	Acute 15, sub-acute 25
Shoulder Pain	1	
Hepatic Pain	1	
Fainting	15	Often associated with acute pain
Bleeding & Pain	51	Acute Pain 22
Bleeding	25	
Swelling	1	
	<hr/> 134	

BLEEDING, the next most constant symptom occurred as a first symptom in this series with or without pain in 76 cases - over 55%. Woo (2) found an incidence of 77.3%. The bleeding is never severe and is irregularly continuous and prolonged. Munro Kerr (1) also stresses this characteristic. Dougal (5) refers to the symptom-complex, amenorrhoea, pain and bleeding, as present in

64% of his series. The commonest type with repeated small haemorrhages occurred in 60%. Allan (9) reviewing 32 cases affirmed that irregular bleeding was the most constant symptom, pain was next in frequency. Scindenberg (10) describes an unusual case of ruptured ectopic with four months' gestation. There was no external bleeding and very few signs of haemorrhage although the abdomen was full of blood. The signs were more suggestive of a gradually developing peritonitis.

Pain and bleeding spread over a few weeks with or without a preceding amenorrhoea are very suggestive of an ectopic. The commonest condition which may be mistaken for it is salpingo-oophoritis, the differentiation will be discussed later.

The duration of these symptoms before patients sought advice varied much, about a third of the cases came in within a week of the onset of the symptoms. Only six came in on the day of the attack of pain, 25 cases had symptoms between 2-5 days. A larger number (about 42%) had symptoms lasting from 2-4 weeks. So that taking in the first week about 80% of cases were seen within the first month. It is significant that only a small percentage sought advice immediately at the onset of the symptoms. It will be noticed that cases with pain as one of the first symptoms sought advice earlier than those unaccompanied by pain.

All the cases with haemorrhage only as the first symptom, except 3, came in after two weeks or later. Of those with pain and bleeding starting together, a larger proportion sought advice after the first week, presumably on the supposition that it was a belated period.

The passage of a Cast was suspected from the history in nine cases, and definitely noticed in five cases only. In one case under observation in hospital a complete

cast was passed without any constitutional disturbance. Operation next day revealed an ovarian pregnancy of two months.

Table VIII Duration of symptoms before advice was sought

	Pain	Pain & Bleeding	Bleeding only	Total
1 day	6			6
2-5 days	16	7	2	25
6-10 days	10	9	1	20
11-15 days	6	8	8	22
3-4 weeks	8	17	10	35
5-8 weeks	8	5	4	17
3-4 months	2	1		3
? Duration	1	4		5
				133
Plus Lithopaedian of 8 years' duration				1
				Total 134

UNUSUAL SYMPTOMS

Shoulder pain was marked in three cases but predominated in one case. This patient could not lie flat in bed but had to be propped up. As pelvic findings were indefinite, the gestation sac being anterior to the fundus, diagnosis remained obscure for a few weeks, till finally operation cleared the ground. Another patient had marked pain between shoulders and in chest with an acute attack, and was proved to have free blood. Two cases with three months' gestation complained of epigastric pain, one of these had symptoms of hyperemesis gravidarum and died after operation. Fitzgerald and Brewer (8) found that 8.2% of their cases had shoulder-pain, and 5 cases had upper abdominal pain. Peskarck (11) referring to recognition of first effusion of blood mentions two signs: (1) Blueness of umbilicus (2) Pain in shoulders if the patient was laid flat and the hypogastrium was

pressed Roche (12) found shoulder pain in 4 out of 5 cases, preceded by abdominal pain. Riches (13) reporting a case of ruptured ovarian pregnancy noted marked shifting shoulder pain.

FAINTING AND COLLAPSE.

15 cases gave history of fainting at onset of symptoms, 22 patients had symptoms of fainting just before or in a few cases soon after admission—total 37 (27.6%). Belmeý (3) reviewing 167 cases noted syncope in 24% of cases.

MICTURITION AND DEFAECATION

A small percentage of cases complained of these symptoms which were often associated together, but, trouble with micturition was much commoner in proportion.

16 cases had retention, and 23 cases had difficulty or pain with micturition whilst 22 cases had marked constipation and intestinal distension and 10 cases complained of difficult defaecation. These symptoms may arise from one of two causes, either and more commonly as a result of peritoneal irritation from effusion of blood leading to paresis, or later as definite-pressure symptoms when a pelvic haematocoele has formed. Whenever a patient complains of sudden pain followed soon after by marked constipation and distension of abdomen as also difficulty in micturition or actual retention, a strong suspicion of ectopic should be roused. Anuria was not noticed in this series. Herzfeld (14) mentions it.

SIGNS

A careful history eliciting some of the points already discussed is very helpful, a few typical signs will clinch the diagnosis.

The general signs of internal haemorrhage are too well-known to need dilatation

on, the local signs associated with such acute cases being general fullness, often quite soft, with a certain amount of tenderness to pressure and a sensation of free fluid particularly in the anterior or posterior fornix. The sub-acute type may be seen quite early at the onset of the symptoms or after an interval varying from a few days to weeks. In the majority of cases the patient is pale and this pallor is particularly noticeable on the palms of the hands which are peculiarly white. The abdomen is usually resistant and tender in the lower half and sometimes a definite mass can be made out. One case, admitted four days after the acute attack, had a soft non-tender abdomen and the pelvic findings were practically nil except for a suggestion of indefinite fullness high up in one lateral fornix. The typical history and extreme pallor were the only suggestive features and two weeks later she formed a typical haematocoele. Pain was absent throughout her stay of three weeks in hospital prior to operation, nor was there any bleeding during that period. In the majority of cases pelvic examination is difficult owing to extreme tenderness, the patient starting up at the least touch. Banki (15) refers to sudden sharp pain on raising the uterus. Gordon (16) refers to pain on cervical motion. Dawson (17) comments on peculiar tenderness of uterine body on vaginal examination. A bimanual examination is very difficult at times but when it is possible, a soft irregular fullness in Douglas's pouch is very suggestive of blood clots. In cases seen after a week or so, and with slow leakage, a definite tender mass may be felt in one of the fornices. A mass forming anteriorly or just above the fundus is liable to be confused with a uterine pregnancy, if the history of symptoms and the tenderness to manipulation are not particularly noted. Quite often the mass is high up on one or the other side and no mass is felt vaginally. In this series 76 cases had a mass of variable size, in 29 cases no mass could be felt but

there was marked tenderness, 24 cases had indefinite fullness and marked tenderness in Douglas's pouch. In 4 cases no note of pelvic examination is available, three of these having been operated on successfully and one having died immediately after admission. If the cases with fullness in Douglas's pouch are added to those with definite mass we find 100 cases, or 75.7% presented definite pelvic lesions and 29 or 21.7% had no palpable lesion except resistance and tenderness. The natural corollary is that absence of a mass does not negative a diagnosis of sub acute ectopic, the more reliable signs being resistance and tenderness. Belmey's (3) series showed a pelvic mass in 85.5% of cases.

The last two years, whenever possible routine white blood counts, absolute and differential were done and the sedimentation rate noted. The number of cases in which these notes were available was small but worth a mention. Ten cases showed mild leucocytosis varying between six and ten thousand. Eight showed a rise above ten thousand, the highest being 16,000, one had a normal count. The sedimentation rate was noted in 25 cases, only 6 showing a fairly rapid drop within half an hour, the rest taking from 40 mins - 2 hours.

An erythrocyte count was noted in only 9 cases and showed definite lowering to about two and a half million.

Fitzgerald and Brewer reviewing 500 cases took the sedimentation rate in nineteen cases and found it slow. The leucocyte count was 10,000 or more in two-thirds of the cases. 14% had over 20,000, Erythrocytic count was uniformly low.

DIFFERENTIAL DIAGNOSIS

A common mistake is to confuse an extra-uterine gestation with acute and sub-

acute inflammatory conditions, and it is particularly with a view to help to distinguish early between these two conditions that this investigation was undertaken.

A series of 134 cases with inflammatory lesions was investigated on the same lines as the ectopics for comparison of signs and symptoms. In 26 cases the diagnosis was doubtful, omitting these, 108 cases presented material for comparison. Of these seven cases were diagnosed as cystic ovaries, one of these was extremely tender on examination, and with a history of amenorrhoea, pain and bleeding, was suspected ectopic and operated on, three other inflammatory cases were also operated with a suspicion of ectopic gestation. All these had preceding amenorrhoea.

The following table gives a comparison of the frequency or otherwise of a history of amenorrhoea in inflammatory lesions as against cases of ectopic gestation.

TABLE IX SYMPTOM-COMPLEX IN ECTOPIC AND INFLAMMATORY CASES

(a) With Amenorrhoea

	Pain	Pain & Bleeding	Bleeding Only	Pain & M P	Total
Ectopic	15	89	3	-	107
Inflammatory	8	18	-	-	26
Cystic ovary	-	7	-	-	7
Doubtful	2	11	1	-	14

(b) Without Amenorrhoea

	Pain	Pain & Bleeding	Bleeding On'y	Pain & M P	Total
Ectopic	1	26	-	-	27
Inflammatory	31	26	2	16	75
Cystic ovary	-	-	-	-	-
Doubtful	3	7	-	2	12

In this series there was one case of ovarian abscess and the writer has recollection of at least two other cases with a history

of a variable period of amenorrhoea followed by acute pain. These cases are extremely tender, much more so than the majority of inflammatory cases, and having a unilateral mass are much more likely to be confused with ectopic gestation.

In the majority of cases of inflammation, pain starts towards the end of a normal period which may have lasted the usual number of days or often stops abruptly a day or two earlier than usual with onset of acute pain and perhaps fever, only a minority of cases show prolonged bleeding. In ectopics the pain starts simultaneously with the onset of the so-called period which often persists irregularly over a prolonged period.

The differentiation then depends on the following facts:

History	Ectopic	Inflammatory
Amenorrhoea	Frequent	In-frequent
Bleeding	Irregular & prolonged	Usually normal M P or abrupt stoppage
Pain	Precedes or accompanies bleeding	Follows bleeding
Pallor	R B C s low	Not marked
Sedimentation	Slow	Rapid
Leucocytosis	Slight increase	Marked increase

An early and definite diagnosis is essential as the treatment differs so widely, being conservative in one, and active in the other. One need only make a passing reference to the other abdominal crises e.g. twisted ovarian, acute appendicitis, perforation of a viscus which would have to be differentiated, but as immediate laparotomy is indicated in all, the diagnosis is more of academic interest, except that the location of incision will depend on definite diagnosis. An acute ectopic will be distinguished by

marked pallor which is characteristic. It must be remembered, however, that the profound shock which is common to all abdominal crises, often tends to obscure the underlying cause.

TREATMENT

All are agreed that a laparotomy is the right treatment for all cases of ectopics except those with infected haematocèles', but there is less agreement over the TIME FOR OPERATION. In the present series, only 19 cases were really acute emergencies, the rest of the emergencies (total 38) being more of a sub-acute nature with clots and often adhesions. Leith Murray (4) found only 4 desperate emergencies in 146 cases. We had 40 cases noted as semi-emergencies having been done by election at a suitable hour. Of the nineteen acute cases one had blood transfusion, five were given auto-transfusion and four had intravenous gum-saline. One of the cases who received auto-transfusion was very critical on admission with a pulse of 170 per minute, she was watched for nearly twelve hours and as reaction was not too perceptible, an operation was decided on. She made a good recovery.

The trend of opinion these days seems to be to defer treatment till the patient has got over the initial shock. King (18) during a discussion on ectopics thought that immediate operation was unwise where the shock was profound. In his opinion the shock was due largely to peritoneal irritation and not to actual blood loss. Gordon (16) feels that watchful delay before operation will reduce mortality. The majority of cases give time for careful consideration and preparation, only an occasional case dying before any treatment can be initiated. A preliminary blood-transfusion or auto-transfusion if the blood is fresh helps to tide the patient through the operation and shortens convalescence.

Brunner (19) is against re-infusion of blood and considers there are many dangers to be avoided, such as, air embolism, cardiovascular complications, possible infection of blood, haemolysis and agglutination in peritoneal cavity, toxins from defibrinated blood too rapid cooling during transfusion and disease of kidneys. He concludes that the method, though it may show results in a large institution in well-selected cases with good assistance and team-work is entirely unsuitable to and may be highly dangerous in smaller hospitals. Certainly the cases for re-infusion need careful selection and in no case should stale blood be used.

In this series a number of cases were treated expectantly for a variable period before operation, as the diagnosis was doubtful. Such delay often makes for difficulties in operating owing to formation of adhesions. We find now that with a better understanding of the finer points in diagnosis, a larger number of cases gets operated earlier than what obtained a few years ago.

It is usual to remove the affected tube but there is a tendency in certain quarters to conserve the tube. Beckwith Whitehouse (23) discussing Salpingostomy versus Salpingectomy advocates the former in cases of tubal mole and abortion. He does not think this treatment suitable for cases of tubal rupture with severe haemorrhage where life is at stake. It will be interesting to get the after-histories of the cases in which the affected tubes were conserved. Dawson (17) reports four ectopics in the same patient. She had salpingostomy each time. Hasselblatt (20) reports two cases of repeated pregnancy in the same tube, in one mid-third was removed and in the other mid-third was conserved. Gestation occurred in the stump in each case. He advocates radical removal of tube and a wedge from the cornu,

Saass (21) reports recurrent ectopic in the stump of the same tube five years later, The other tube being healthy.

Tubal gestation has a tendency to recur in the same patient but not necessarily on the same side. In this series 5 cases came back for repeated ectopic, all on the opposite side. One came in five years later, two after an interval of two years each, and two within a year.

Dougal (5) reviewing 100 cases found 13 subsequent ectopics. Apajalati (26) commenting on the late result of operation for tubal gestation reports 300 cases of which 18 had recurrent ectopics. For anaesthesia we have usually resorted to local infiltration combined with open ether.

MORTALITY

In this series there were six deaths one of whom was admitted in extremis and died before operation, thus giving 5 out of 133 or 3.8%.

Causes of death —

- 1 Preceding toxic absorption (macrated foetus of 4 months, in sac with adhesions)

- 1 Preceding Hyperemesis Gravidarum

- 1 Shock of acute rupture (died soon after operation)

- 1 Post operative shock (macrated foetus of 4 months in sac with adhesions general toxæmia)

- 1 Paralytic Ileus —after operation

This series has been compiled mostly from cases treated by myself and my colleagues at the Cama Hospital, spread over a period of about twelve years and was made possible by the careful records kept by a succession of house-surgeons. My special thanks are due to the theatre sister Mrs Gangubai Dighe and to the ward sister Mrs Muk-

tabai Sakhardande, for efficient arrangements and nursing which were a source of great comfort in acute emergencies

Lastly I am grateful to Miss Aptekar, one time resident, for her untiring energies in assisting to collect and tabulate the records and also for help with reviewing of literature

SUMMARY

1 134 cases of Ectopic gestation are reported

2 Ampullary gestation was the commonest 60.8%

3 Most cases seemed to terminate within the first seven weeks

4 Abortion or rupture occurred with almost equal frequency, a larger number of acute cases being in ruptured gestation. Rupture was commoner in Isthmial gestation

5 Parity and age-distribution are discussed

6 In the majority of cases interval to preceding pregnancy was not noticeably long

7 Symptom complex -amenorrhoea pain and bleeding-is discussed in detail

Majority sought advice within 1-4 weeks of onset of symptoms. Pain, often accompa-

nied by bleeding, was the most predominant symptom. Cases with bleeding as the first symptom sought advice later

8 Some unusual symptoms e.g. shoulder-pain is discussed

9 Fainting and collapse was noticed in 27.6% of cases

10 A review of physical signs stressing the significance of abdominal resistance, tenderness, pallor, and extreme tenderness on vaginal examination

In 21.7% no mass was felt per vaginum

11 Report of blood examination in a few cases, low Erythrocyte count, moderate leucocytosis and a slow sedimentation rate

12 Differential diagnosis, particularly from acute and sub acute inflammatory conditions in the pelvis. 134 cases of inflammation reviewed. Special differentiating points being absence of amenorrhoea in the majority, pain towards end of menstruation, and an abrupt stoppage of the period

13 Treatment-laparotomy preferably after initial shock is over come, removal of tube advocated

14 Small percentage of recurrence

15 Causes of death in the six cases lost are reviewed

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CHOLECYSTITIS IN SURGICAL PRACTICE OF A HOSPITAL

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"Surgeon of the future must be more than a Clinician - he must be a biologist in the widest sense. He who has to work with the organs and tissues must be conversant with the laws which govern them" (Prof O'Lambret, L'Echo Medicale Du Nord 1936 V 1)

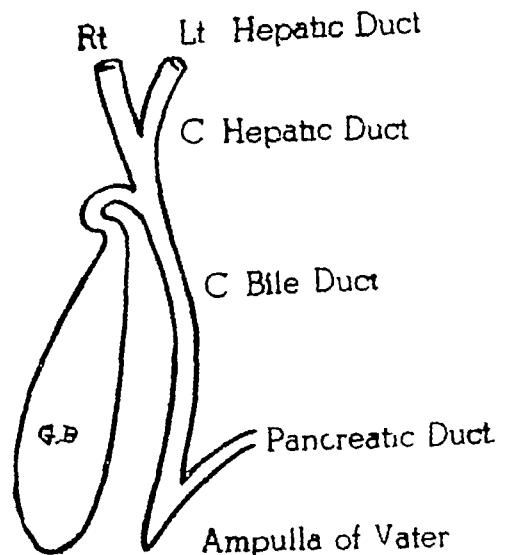
Chronic Cholecystitis exists as a distinct disease and results from slow, indolent, intramural blood-borne infection (Wilkie 1937) Chronic cholecystitis is more common than acute, though once the latter has occurred with sudden obstruction, a complete resolution to statu quo ante almost never takes place

McNee (1937) claims that disease of the gall bladder is the commonest of all organic troubles of the digestive tract. In our unit of 48 general surgical beds of the surgical section of the King George's Medical College Hospital, Lucknow during a period of about 18 months, 18 cases of gall bladder disease have been treated. Other cases of the same condition must have been treated in other units of this hospital, but they are not taken into account here. During the same period however seventy cases of appendicitis were treated in our unit. Higher figures in respect of appendicitis most probably are due to the public beginning to realise the dangerous consequences of neglecting that disease.

Another cogent factor may be that gall stones affect females twice or three times (G Grey Turner 1932) as frequently as the males. The purdah (Veil) observing females avoid public hospitals unless desperately ill. Our bed accommodation for females being limited is yet a third factor. Whatever be the real cause, these considerations must weigh with us in noting the great disparity

in the incidence of these diseases in our hospital.

The Anatomy of extra hepatic bile passages favours great frequency of disease in Gall Bladder. It is a bag or diverticulum hanging from porta hepatis without any opening to drain it at its dependant part. Its narrow neck above ends in the cystic duct, one to one and a half inches long, which joins the common hepatic duct to form the common bile duct. Often an out-pouching of the proximal end of the gall bladder is also present called Hartmann's pouch, especially noticed in chronic inflammations. The hepatic and common bile ducts drain depend-



antly. The terminal portions of the latter lies successively behind the superior portion of duodenum, embedded in the groove on the posterior surface of the head of the pancreas and then traverses obliquely the wall of duodenum for 1/3" to 1". The cystic duct is about 1/10", while the common bile duct is 1/3" and the end of the bile papilla is less than 1/12" in diameter. Liver excretes 1

to 1½ pints of bile per diem. Its production is continuous and is the channel by which the products of disintegration of R B C are got rid of.

Gall Bladder mucosa was proved by experimental work of Rous and McMaster (1921) to be able to absorb water from contained bile rapidly concentrating it to a tenth part within a few hours. Graham Cole, Copher and Glover (1924) have elaborated Cholecystography based on the same facts. In addition to water possibly lipoids, fats and cholesterol are also normally absorbed. Whatever be the ultimate truth about the exact pathology of cholecystitis here we have two outstanding features inviting trouble.

A dependant diverticulum draining through its outlet against action of gravity and capable of considerably concentrating its contents.

That bile has slight inhibitory properties against certain bacterial growths is rather a poor consolation.

The above considerations affect alike human beings living either in the West or East, Tropics or Temperate Zones, and people of all races, creeds and castes.

Henceforth we will present and discuss the causation, course and control of cholecystitis as represented by the meagre record of the present series of 18 cases. No selection of cases has been made. They are recorded as they came in.

Seasonal variations in admissions apparently need not influence such a disease. Yet these cases came in July 2, August 3, September 3, October 1, November 2, December 1, January 4, March 1, and April 1.

Two considerations arise in the mind. There is a traditional belief in the public mind that surgical treatment succeeds most in winter

months—the peak of 4 was reached in January. Perhaps in winter people stay more quiet and in doors and that may produce stasis in bowels and be reflected in gall bladder pathology.

RESIDENCE

All 18 cases hail from cities. Thus urban life predisposes to this disease. This property is shared by such diseases as gastroduodenal ulcers, cancer stomach, and chronic appendicitis in our experience. Indiscretions in diet, fatigue and excitement are common in town dwellers. Intestinal toxæmia from chronic constipation, abuse of purgatives, food poisonings, biliousness and hepatitis due to abuse of alcohol and other agents (Hurst 1938) afflict urban population more commonly. The hard life that villagers lead and the coarse food consumed by them probably prevent stasis of bile and explain this discrepancy.

Acute appendicitis and intestinal obstruction however do not discriminate between town and village dwellers.

DIET

Non-vegetarians preponderated among the victims of this disease being 11 as against 7 vegetarians. The vegetarians form the bulk of the population in these provinces, constipation and intestinal toxæmia appear in our experience more commonly among non-vegetarians.

AGE AND CORPULENCE

55% between 1 and 10 years, nil between 11-20, 56% between 21-30, 33% between 31-40, 55% between 41-50 years of age. Peak is reached about two decades earlier than in the experience of Grey Turner (1932) in England who records that patients finally seek surgical aid, usually when 45 or 50 years old. Early marriage and child-bearing prevalent in the local population possibly explains this. Only two

of these 18, incidentally both women, were fat Six of the twelve females here recorded could well deservedly be classed as slim and were never fat in their life In the tropics fevers and infections are very frequent Possibly this predisposes to early onset of cholecystitis

Hypercholesterinaemia occurs at the height of fevers, in a variety of febrile and infectious conditions (H Gainsborough 1931) Increased blood cholesterol has probably a definite etiological connection with gall stones and perhaps cholecystitis

SEX

Females out-numbered the males being twice as many

- I Acute cholecystitis accounted for three males and one female child
- II Chronic cholecystitis with Gall stones accounted for 7 females and two males—females represented 78% of sufferers
- III Chronic Cholecystitis without Gall stones accounted for 3 females and one male—females being 75% of sufferers
- IV Choledochitis—(not traced in literature as a distinct disease, yet found here)—accounted for one female

RELIGION

Hindus 14	{	4	Acute Cholecystitis
		2	Chronic Cholecystitis without gall stones
		1	Choledochitis
		7	Cholecystitis with stones
Mohammedans 3	{	1	Chronic cholecystitis without stones
		2	Chronic cholecystitis with stones
One Christian			Cholecystitis with stones
call for no remarks			

FECUNDITY

Except the child of seven all the rest of the females were married, out of eleven married women seven were found to be suffering from chronic cholecystitis with gall stones

AGE & PARITY (Females)

	Total number	age	children
Chronic Cholecystitis with Gall stones	7	35	4
		35	2
		31	9
		28	3
		26	3
		28	6
		48	8
Chronic Cholecystitis without Gall stones	3	40	10
		25	2
		20	0
Choledochitis	1	30	4
Acute Cholecystitis	1	7	0

ANTECEDENT DISEASES (All Cases)

Diabetes Mellitus	1
Plague	1
Typhoid	2
Jaundice, (as a symptom of Catarrhal Cholangitis)	1
Dysentery	1
Pneumonia	1
Appendicitis	1
Mastoiditis	1
Enlarged Spleen (? Malana) & Haemorrhoids	1

One or more may have existed in the same patient

Cases confirmed at operation and in Pathology Laboratory as those of cholecystitis and gall stones

Case Number	Antecedent Disease	Beginning of abdominal symptoms suggesting gall bladder disease
1	Diabetes 1935 (Detected)	Indefinite
2	Plague 1926	1928
5	Dysentery 10 years back	Since 1931
6	Nil	Since 1932
8	Severe constipation over three years ago	1935
9	? Catarrhal Cholangitis (Jaundice 1907)	Since 30 years
11	Typhoid 1926	Since 6 months
12	Nil	1928 started 6th month of last preg
18	Appendicitis 1930 All teeth extracted for Pyorrhoea 1934	1932

2, 8, 9, 11 had frank Pyorrhoea Alveolaris

ACUTE CHOLECYSTITIS

Case No	Antecedent Illness	Date of attack
3	Typhoid 1 year back	15-8-37
10	Mastoiditis, operated 1907	2-4-38
13	Had enlarged spleen with fever & rigors (? Malaria) Piles 1924	22-9-38
16	Flatulence & irregularity of bowels for 9 months previously	6-11-38

CHRONIC CHOLECYSTITIS

Case No	Antecedent illness	Beginning of abdominal symptom suggesting G B disease
7	Nil	1937
14	? Catarrhal Cholangitis (Jaundice 1918) Pneumonia 1935	19-3-38
15	Nil	1937
17	Nil	1937

CHRONIC CHOLEDOCHITIS

4	Jaundice 9½ years ago Puerperal Sepsis 8 years ago Diarrhoea & constipation indefinite Never enjoyed her meals	1927
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HABITS OF LIFE

EXERCISE among Males--4 had active & 2 sedentary habits Females--2 were active & 10 sedentary "

DRINK & SMOKE among males Case 1 smoked and took Alcoholic stimulants freely Case 16 smoked 5 packets of cigarettes (one dozen per packet) per day
Among females case 4 took liberal alcoholic stimulants on festive occasions

INVESTIGATION OF CASES

Patients with cholecystitis usually present a characteristic clinical picture those that have acute infective cholecystitis are characterised by rapid onset (cases 3, 10, 13, 16) of abdominal pain with nausea and repeated vomiting, pain and tenderness with

guarding of muscles under the right subcostal margin. Temperature rises up and there is leucocytosis. A distended and tender gall bladder can at times be felt.

In chronic cholecystitis with or without gall stones they present in a large majority of cases a most characteristic history. They complain that they experience a ball of wind rising up in the upper abdomen producing distress in the heart followed by palpitation and at times a sense of depression and fainting. These are marked a variable time after the evening meal, though the night sleep is rarely disturbed except when pain is prominent. Pain, when complained of, is of a mild nature at first located immediately below the right subcostal margin and sometimes going through to the back. These symptoms wax and wane but are progressive causing ultimately constant dyspepsia and ill-health and enjoyment of food is lost.

Almost all the cases mentioned here were strongly suspected to be of cholecystitis on clinical grounds alone. Severe recurrent colicky attacks with aggravation of tenderness and confinement to bed and at times slight icterus indicated strongly presence of gall stones causing obstruction.

Routine examination of urine, faeces and blood was done. Rectal (when available vaginal) examination was done in all cases. Confirmation of diagnosis was sought by --

1 Duodenal intubation, and microscopic and cultural test of the fluid obtained

2 Straight skiagraphy and also cholecystography in non-jaundiced cases

3 Special tests-- Plasma cholesterol, Van Den Bergh and Icteric Index determination were done to find their significance in differential diagnosis

In the table given below only significant facts are recorded for brevity

CLINICAL FEATURES OF CASES --

Case	Marked clinical features
1	Male, aged 36, skin right hypochondrium pigmented with blue black markings of veins caused by prolonged fomentation, guarding of upper half right rectus muscle, Murphy's sign plus, Boas' sign plus, pain in right shoulder but no tenderness
2	Female, 35 (three pregnancies) Murphy's sign plus, gall bladder palpable
3	Girl of 7, Ligat's pinch test positive Superficial hyperaesthesia rt hypochondrium Gall bladder palpable and tender Pyrexia--(102 F) sudden severe epigastric pain early morning, vomits 3, loose motions 4
4	Female, 30 (three preg), very fat, respiratory movements restricted in rt hypochondriac and lumbar regions, Murphy's sign positive, Ligat's pinch test positive
5	Male, 22 Icterus conjunctival and palate--Murphy's test positive, anterior end of right IX rib tender
6	Female, 31, (9 preg) hyperaesthesia right hypochondriac and lumbar regions, Ligat's test positive, Murphy's test positive, gall bladder palpable
7	Female, 25, (two preg) Icteric Conjunctivae, right hypochondrium lags behind in respiration--Murphy's sign positive, Boas' sign positive, Ligat's test positive

Case	Marked clinical features	Case	Marked clinical features
8	Female, 26, (three preg), very lean & thin, Right upper half abdomen tender, cutaneous hyperaesthesia and Ligat's test positive Involuntary rigidity of muscles same area, Liver enlarged 3 fingers, spleen 2 fingers		epigastric, umbilical, hypochondriac & lumbar regions Boas' test positive, Rectal examination negative Severe colic 4 A M, vomits 3, loose motions 3, T 101 F
9	Female, 48 (8 preg), gall bladder palpable and tender, Murphy's sign positive	14	Male, 40, spare built, icteric tinge eyes, Ligat's test positive, Involuntary rigidity present in right hypochondrium
10	Male, 23, marked guarding of muscles in right hypochondrium Sudden colic at noon, vomits two, persistent nausea, icterus	15	Female, 40 (10 preg), Slim, Gall bladder felt and tender
11	Female, 28 (3 preg), cutaneous hyperaesthesia positive, Ligat's test positive, Murphy's sign positive	16	Male 23, guarding of muscles, right hypoch Murphy's sign and Boas' sign positive Sudden colic 10 P M, persistent nausea, T 101 5 F
12	Very fat lady, 35 (4 preg), two operation scars right hypochondrium- Murphy's sign plus	17	Female, 20 (0, preg) Scar of Appendicectomy, Murphy's and Boas' sign positive, tender right shoulder back and front
13	Male, 30 Hyperaesthesia below umbilicus right side Tenderness & involuntary rigidity present in right	18	Female, 28 (6, preg), scar of appendicectomy, Murphy's sign positive

OPEROPSY REPORTS

Cases	Diagnosis	Treatment	Report on operopsy material
1	Chronic Cholecystitis with Gall Stone,	Cholecystectomy without opening C Bile Duct	Mixed faceted stones 50 in number—G B Wall 0.5 CM thick Bile culture sterile
2	Cholecystitis with gall stone	Cholecystectomy	Stones and Gall bladder as in last Intramural culture G B B Coli Intra luminal—sterile
	Acute Cholecystitis	Cholecystostomy Incidental appendectomy No Gall Stones Mucopurulent bile	Biopsy of Gall bladder Inflammatory changes in Mucous membrane Bile-Culture-growth of B Coli
4	Cholangitis & Chr Pancreatitis	Cholecysto-Duodenostomy	G B Bile duct thick and hard Size of thumb Gall bladder biopsy section—No change in histology Bile culture—Pseudomonas Pyocyaneus
5	Cholecystitis with stones	Cholecystectomy	Hartmann's pouch packed with septic stones & G B. Mucous membrane red and granular, not quite strawberry like patchy distribution Two ounces thick bile Culture staphylo-coccus-aureus and streptococcus Faecalis Stones yellow on section and green on surface
6	Chronic Cholecystitis with Gall Stone	Cholecystectomy & Choledochostomy Later required gastric suture & resection of biliary fistula and resection of an encysted peritoneal abscess	Chronic complete perforation near fundus of G B was found Stones Thickened G B and Bile duct found Histological report not available
7	Cholecystitis and Chr- Pancreatitis	Cholecysto-duodenostomy Diseased appendix removed	Biopsy material from Gall bladder-section showed chronic inflammatory changes Appendix-Histology-Fibrotic changes
8	Impacted stones common bile duct	Choledochostomy	Gall bladder histology, inflammatory changes of long standing Single large stone (Cholesterol) fixed in ampulla of Vater with plenty of biliary mud
9	Chronic Cholecystitis with gall stone	Cholecystectomy Diseased appendix was also removed	G B histology Marked fibrosis in its wall Bile and tissue culture report not available

Cases	Diagnosis	Treatment.	Reports on operopsy material
10	Acute Cholecystitis	Conservative and expectant	—
11	Chronic Cholecystitis with gall stones	Cholecystectomy	Gall bladder contained ten stones Intramural culture B typhosus Hist Section—Inflammatory changes of chronic type with hyperplasia of glandular tissue
12	do	do with drainage of C bile duct	Thick walled G B Two stones and biliary mud in C Bile Duct, Multiple septic stones in G B Intramural culture—sterile Intraluminal—A few G + Diplococci, Histology—Fibrosis and atrophy of Mucous membrane
13	Acute Cholecystitis,	Conservative and expectant	—
14	Chronic Cholecystitis without stones	Cholecystectomy and Choledochostomy	Gall bladder thick walled Intramural culture—G + bacilli & Diphtheroids Intralu- menal—sterile
15	do	Cholecystectomy	Gall bladder thick, section—Inflammatory changes of chronic nature in G B, wall Bile culture—B. Coli and pseudomonas Pyocyaneus
16	Acute Cholecystitis	Conservative and expectant	—
17	Ch Cholecystitis without stones	Cholecystostomy Head of Pancreas thicker and firmer than normal	Gall bladder neck opaque with a few adhesions Biopsy-section No inflam- matory changes Bile-organisms of Para- Colon-group
18	Chronic Cholecystitis with gall stones	Cholecystectomy	G B very thick walled Multiple septic stones Section—increased fibrous tissue in wall of G B Bile, Strep Faecalis

DISCUSSION OF ETIOLOGICAL FACTORS AGE AT ONSET

Cases recorded are very few. No pretensions are made to represent a comprehensive view on this subject in India.

ETIOLOGICAL FACTORS preponderance of females (given under heading of sex) is, as usually observed in all parts of the world, very high. Males account probably for larger percentage of acute infective cholecystitis. However one fact is obvious that the disease, probably in all its phases, commonly exists in India and is not rare as held by Rolleston (1925). Urban life predisposes to the disease (as discussed under heading 'Residence' above) cent per cent of patients came from towns only. In our midst where vegetarians easily outnumber non-vegetarians, it is significant to note (under heading diet) that 61% of the cases were non-vegetarians.

Religion has had no effect on the statistics, cases approximated to their existing ratio in population.

FECUNDITY

As the disease is extremely common among females, and they have the distinctive function of procreation, the vexed problem of its exact etiological relationship presents itself. Gross of Leeds, quoted by Gray Turner (1932) and by Dick and Illingworth (1936), claims that it is more apparent than real.

Obesity was only noted in 17% of our females.

Repeated pregnancies during which stasis of bile is prone to occur, must have direct or indirect relationship to the onset or aggravation of cholecystitis. However only in case 12 does the woman fix the onset in the 6th month of 4th pregnancy. Whether this is purely due to stasis or some spasm of sphincter of Oddi (Flint 1937-Boyd 1933) remains unsettled.

While every age, sex and type of patient may suffer (McNee 1937) from cholecystitis yet the greatest majority of cases in Europe and America are reported to be over 30 years of age (Gray Turner 1932, Graham Cole, Copher and Moore 1929) and specially in the fifth and sixth decades of life they seek treatment. There is a distinctly significant point that the disease incidence is about 2 decades earlier here. Most probably the factors that cause this are some or all of the following—

- 1 Early marriage and repeated pregnancies
- 2 Great frequency of and liability to infections in tropics
- 3 Dehydrating effect of hot climate causes concentration of bile

ANTECEDENT DISEASES

Previous history of Typhoid fever, Dysentery or of the symptom of jaundice (in absence of a proper record of diagnosis as is prevalent) makes one inclined to suspect Cholecystitis.

Diabetes with its known hyper-cholesterinaemia possibly had a causative connection in case 1. Typhoid bacilli were grown from the wall of Gall Bladder in case 11 with a 12 years antecedent history of that fever. Cases 7 and 18 had previous appendicitis. Pyorrhoea Alveolaris was not frequent.

DIAGNOSTIC FEATURES

1 Acute Infective Cholecystitis presents marked features of a surgical emergency and is dealt with on the same lines. Two hourly record of pulse rate, character of vomit, extent of constipation, pyrexia and

leucocytosis with signs of peritonitis in the right hypochondrium all indicate acute inflammatory lesion locally

Previous history of chr gastritis, gastro-duodenal ulcer, recurrent appendicitis, tuberculous peritonitis, amoebic dysentery, gall stone colic will lead the surgeon to do specific investigations and diagnosis. In the cases here quoted Nos 3, 10, 13 and 16, sudden upper abdominal colic, catch in breath, involuntary guarding of muscles, rapid pulse, pyrexia between 101 and 102 F and uniform leucocytosis, with location of pain at first in epigastrium, later settling down in rt hypochond and slight icterus decided early tentative diagnosis. From history and physical examination we excluded the other possibilities in differential diagnosis. Confirmation was obtained in No 3 by operation necessitated by rapidly rising pulse rate, a tender palpable mass and signs of unabating peritonitis. Biopsy of gall bladder and cholecystostomy confirmed the diagnosis. In cases 10, 13 and 16 diagnosis remained on clinical, physical and laboratory findings.

It is significant from the chart of pathological findings that Van den Bergh test in the course of the illness became indirect positive indicating haemolysis in the body. This may mean indirectly toxic poisoning of liver which caused haemolysis (Nigam 1938). In case 8 Van Den Bergh was immediate direct positive indicating obstruction in bile passages. She had Charcot's intermittent biliary pyrexia. The value of Van Den Bergh test is enhanced by collateral icteric index determination—alone, the latter may not help much. For instance in case 5 increased blood destruction is indicated by delayed direct V D B +, and indirect +, and Icteric Index was 7.5. In cases 11 and 18 V D B is -completely negative, yet Icteric Index is high 37.5 and 30 respectively showing the presence of some other yellow pigment e.g. derived from food being

responsible for the high index and not necessarily blood destruction. Excess of bilirubin in blood is indicated by icteric index being 30 on second day of admission and 16 three weeks later in case 10, it was 45 in the acute stage in case 16, and 18 in case 13. This most probably was due to active haemolysis going on in cases 16 and 10 during the acute infective phase.

It is regretted that laevulose or galactose tolerance tests could not be done for want of reagents to assess hepatic inefficiency.

In cases of chronic cholecystitis with gall stones the characteristic history was assessed with clinical and pathological findings. The histories were of prolonged flatulent dyspepsia varying from 3 years to 30 years in duration with recurrent acute attacks of pain in or about the right hypochondrium except in No 11, who gave only a 6 months history of gall bladder dyspepsia.

Murphy's sign was present cent per cent. Tenderness and involuntary guarding of muscles was present in 44% of cases, Ligat's pinch test in 22% of cases, Gall Bladder was palpable in 33%, tender rib right shoulder pain and Boas' sign each in 10% of cases, icterus in 22%.

Serum Cholesterol and its significance is claiming our increasing attention. Normally among our population it never ranges above 150 mgm per 100 c.c. of blood plasma. In cases of gall stones it was high in 56% of cases. In chronic cholecystitis without gall stones it exceeded normal level in 75% of cases tested and in acute cholecystitis in 66% of cases. The chief sources of plasma Cholesterol is from 1 Food, 2 Destruction of cells of various tissues and organs e.g. R.B.C., ovaries, adrenal glands and nervous gray matter. Articles of diet rich in cholesterol are proverbially deficient in Indian dietary (yolk of eggs, brain, fats, cream, butter, fat bacon and pork.) Liver and Kidneys are rich in

cholesterol Main bulk of stones was found to be cholesterol even in septic stones Samson Wright (1914) quotes Whipple with the remark that a patient with gall stones who is not jaundiced shows no alterations in the blood cholesterol Whatever be the significance of this, the fact remains that increased serum cholesterol in presence of other suggestive factors adds strength to the presumptive diagnosis of chronic cholecystitis

VALUE OF CHOLECYSTOGRAPHY AND STRAIGHT SKAIGRAPHY --

As far as possible straight skiagraphy was first done and in non-jaundiced cases cholecystography as well

Gall Stones are classed as --

1 Septic or mixed or Cholesterol-bilirubin calcium stones account for more than 80% of Gall Stones (Gray Turner) If calcium content is above 10% they are seen in a straight skiagram

2 Pigment stones are rare and radio opaque

3 Cholesterol stones The metabolic stone of Aschoff, usually single—translucent to X-Rays

If the dye (tetra-iodo phenolphthalein) is absorbed from the gut, and there is no block in cystic duct, and the gall bladder mucosa is sufficiently healthy and concentrates bile, this dye will visualise the gall bladder—density of the shadow being directly proportionate to the functional efficiency of G B to concentrate bile Not much significance is attached to delay in the filling or emptying of G B Negative shadows in the opacity suggest gall stones

Four cases were of acute cholecystitis, in one case a straight skiagram visualised a septic gall stone, two had jaundice, three had high icteric index & in the last two categories dye administration was deemed unsafe Thus we were left with 8 in which the test was

done We had three successes (two showed deficient concentrating power and one negative shadows—all confirmed correct at operation) It failed to visualise G B in cases 1, 2, 5 and 11 Gall bladder at operation contained bile and stones but what degree of obstruction existed in the cystic duct it is difficult to say At least it was not impermeable and in case 7 gall bladder and cystic duct were found patent at operation Hence the field of utility of this form of very useful test is restricted

Duodenal intubation was done only in 4 cases, two of chronic Cholecystitis with Gall stones and two of chronic Cholecystitis without stones, one of each or 50% showed presence of pus cells and organisms This test gives promise of extended service in diagnosis

TREATMENT Case 8 with obstructive jaundice cirrhotic liver, enlarged spleen and advanced cachexia in spite of prompt relief by Choledochostomy and removal of impacted stone at the end of bile duct died within a week, of exhaustion without pyrexia—so that there was no indication of liver death Post mortem not allowed If some slow decomposition like that used for enlarged prostate could be improvised it may be useful

Cases 10, 13, 16 with acute cholecystitis were advised to come after a month for cholecystectomy which is we believe the correct operation otherwise septic focus in gall bladder persists Cases 4 & 7 were side-tracked with cholecysto duodenostomy—with complete relief Urinary diastase was subsequently found normal

Rest of the cases were treated by Cholecystectomy exploring the C Bile Duct where doubtful of obstruction—dilating it and draining it

One case of severe acute Cholecystitis

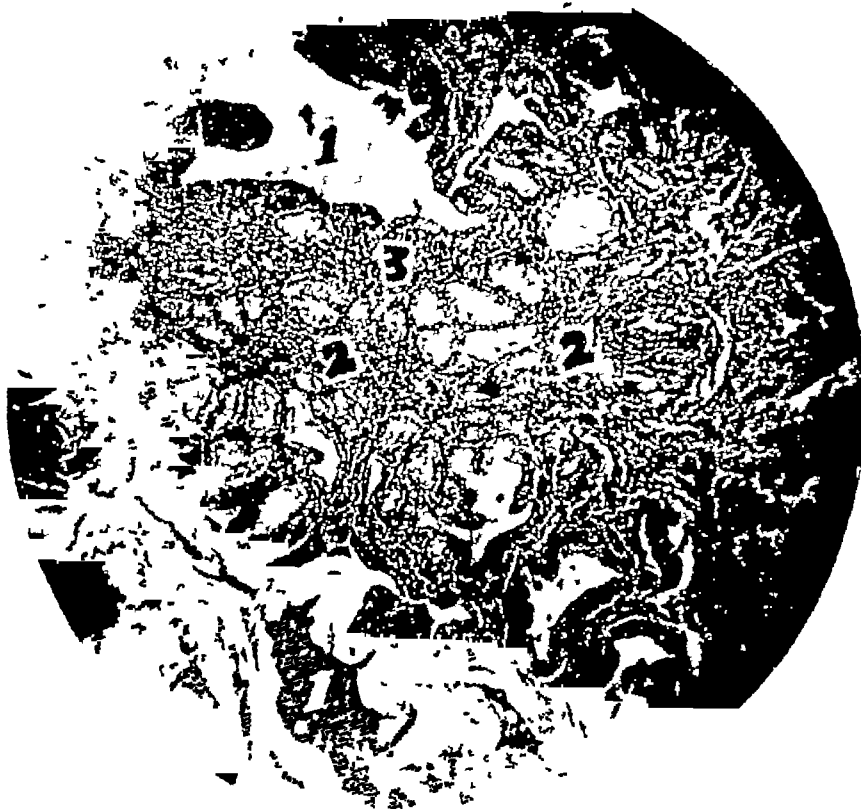
in a girl of 7 was treated by Cholecystostomy

In the adults, only case 17 was treated by cholecystostomy as it was macroscopically a healthy gall bladder. In our opinion this operation is only justified when suspicion about disease is very faint

All the above operated patients except No 8 are relieved and symptom free up-to-date

dyspepsia Case 17 shows that Bacilli of Paracolon group infected the bile. Pneumonia and Paratyphoid fever are likely to be precursors of acute cholecystitis (This coincides with observation of Grey Turner, 1932)

More virulent organisms are perhaps responsible for these cases, and the time before relief was sought was insufficient for



1 Dilated Mucous glands (probably Rokitsky Aschoff Sinuses), (our interpretation) 2 Fibrous tissue
3 Lymphocytic infiltration

A glance at the table on page 25 shows that all cases of Chronic Cholecystitis without stones sought relief within about a year of the onset of their troubles. In case 14 Pneumonia preceded by three years and jaundice (? Symptom of Cholangitis) 20 years before the onset of biliary

secondary gall stone formation

The decision as to the best treatment for cases of the majority of chronic cholecystitis with stones, if they were available early, will be arrived at provided the public were stimulated not to neglect their dyspeptic troubles but seek advice

early When scientific application of any or all the tests discussed above, especially duodenal intubation, will clear the diagnosis and perhaps avoid subsequent serious surgical operations

Laboratory investigation of Operopsy material—showed, among other useful information given in the Chart, that bile from gall bladder of acute cholecystitis (case 3) gave pure growth of B coli Further that among other cases in 2, 11, and 14 intramural culture (taken very kindly by the Pathologist in the operation theatre to avoid contaminations due to delay and handling) gave growth of organisms, B Coli, B Typhosus and G + Bacilli respectively While intraluminal bile culture from interior of G B was found sterile in these cases A Photomicrograph of a section of diseased Gall Bladder removed from case 18 is given above as a sample The legend below it indicates main features

We are indebted to the surgical house staff for much assistance in recording clinical investigations and the Heads of the Pathology department and the Radiology section with their staff in King George's Medical College and Hospital for valuable investigations

SUMMARY

1 Accounts of 18 unselected cases of diseases of Gall Bladder are given

2, Reports on Clinical and Laboratory investigations recorded

3 Special features of these disease processes met with in patients in our parts of India are given and discussed

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A CASE OF SPINAL TUMOUR

by K S Sanjur, M D (Government Headquarter Hospital, Madura, S India)

KALAKURUCHI NAICKER, Hindu, Male,
30 years, Occupation, ryot

Lipiodol seen he'd up at level of 2nd
lumbar ver ebra

ADMITTED ON 21-11-1938 into the
Government Hesdquarter Hospital
Madura

COMPLAINT Two months before admis-
sion pain developed in the left thigh,
together with difficulty in walking
These disabilities increased and se-
vere pain in the lumbo sacral region
made its appearance He is now
unable to walk, mainly on account of
inability to move the left thigh
There were no sphincter disturbances

PHYSICAL EXAMINATION Nervous sy-
stem - Cranial nerves all normal
Trunk and limbs - Sensation - normal
throughout

Motor Power - Diminished in left
lower limb especially in the thigh
Normal in other limbs

Co ordination - normal

Tendon jerks - K J lost on left side
Others normal

Plantar response - Flexor both sides

Circulatory and respiratory systems -
Nil abnormal

Compression of the cord in the region
of the Cauda Equina was suspected
and the following investigations
were done --

Kahn - negative

Cerebro spinal fluid - Xanthochromia,
marked increase of globulin, no
increase of cells

X - Ray after introduction of lipiodal
through a cisterna puncture

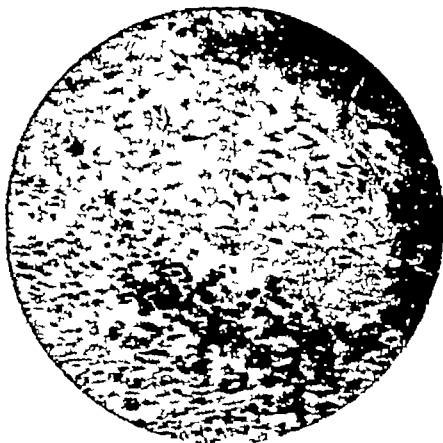


DIAGNOSIS Spinal Tumour

TREATMENT On 12 - 12 - 1938 Laminec-
tomy of 2nd and 3rd lumbar laminae
was done by Capt, F A B Sheppard,
I M S, under general anaesthesia
(Chloroform and Ether mixture) sup-
plemented by local infiltration with
2% novocaine and 1 in 100,000
adrenalin Posterior spinal vessels
were varicose and troublesome bleed-
ing was met with in traversing them
The dura when exposed was seen
to be pulsating strongly above the
tumour level The Tumour it-
self was situated exactly under the
3rd lamina Dura was opened and
a tumour the size of an almond
shell was found lying among
the roots of the cauda equina and
completely blocking the spinal canal
It was removed without difficulty and
the dura sutured with No 0 conti-
nuous catgut The extradural bleed-

ing was controlled by plugging with a bit of muscle cut from erector spinae muscles. Muscles sutured in 3 layers with No 2 catgut. The fascia over the muscle was also sutured.

I am indebted to Dr A Vasudevan of the Pathology Department, Medical College, Madras for the following



description of the tumour and the photomicrograph

'Shows collection of small fusiform cells some having compact nuclei and others vacuolated with eosinophilic cytoplasm. There are more extensive pale myxomatous areas where the cells are mostly stellate, some triangular, and a few spindle shaped, with branching cytoplasmic processes. The stroma is loose and scanty. Blood vessels are few and are of the adult type having well formed walls.

Appearances are those of a fibroma with extensive myxomatous change."

The patient made an uneventful recovery and was discharged on 22-1-1939 able to walk perfectly and free from all pains.

ABSTRACT

The pathology and treatment of recurrent dislocation of the shoulder joint—by A S Blundell
Bankart, London, —Brit Jour Surg 1938, p 23

The author is of opinion that recurrent dislocation of the shoulder joint is not a sequel of ordinary traumatic dislocation which becomes recurrent. In the recurrent type, the very first dislocation shears off from the bone practically the whole of the anterior half of the fibrous or fibrocartilagenous glenoid margin. The defect is therefore permanent and allows free abnormal movement of the humeral head on the slightest provocation. In an ordinary dislocation on the other hand there is only a tear in the capsule which rapidly heals after reduction. The author has verified his findings of recurrent dislocation in twenty seven cases.

The treatment recommended for the condition is operative. The joint is approached through a 5" long incision, roughly along the deltopectoral groove, and the

coracoid process is reflected downwards together with its attached muscles. The Subscapularis tendon is then cut near its insertion, and the capsule is incised if it is not already opened. After raising a thin shelving of bone from the front of the neck of the scapula, two pairs of holes are made leading from the raw surface to just inside the glenoid cavity. Mattress type of sutures are passed through these holes and the free margin of the capsule is sutured on to the raw surface by these. Subscapularis tendon is sutured, the coracoid is reflexed and the fascia and skin are sutured in layers.

The sutures are removed on the tenth day, but the arm is kept bandaged to the side for one month after which active movements are begun.

M V B

अतिस्थूलं, असारं, अतिदीर्घं, अतिन्ह्रस्वं, अग्राहि,
विषमग्राहि, वक्रं, शिथिलं, अत्युन्नतं, मृदुकीलं,
मृदुमुखं, मृदुपाशमिति द्वादश यंत्रदोषः ॥ १९ ॥

सप्तमोऽध्यायः सूत्रस्थानः—सुश्रुतसंहिता

Too thick, without proper temper, too long, too short,
impossible to hold, difficult to hold, bent, loose, too rough,
soft pinned, soft mouthed or with a loose hold, are the
twelve defects of Surgical Instruments

—Sushrut-Samhita, Sutrasthana, Ch. VII, Verse 19.

يحب (على الحزاح) أن يكون صحيح السطر مطلقاً ،
قوتى الدراعين ، حفيف الحركة ، بصوحاً ، صدوقاً ، وأن
تكون آله نقيه محكمة لئلا يُعدي ها وأن تكون نفسه
قوية الاقدام ، شعوقاً بالطبع أو التطع .

— داود الأطاكي

. The Surgeon must be an accurate diagnostician, strong
of arms, quick in action, honest and truthful in character.
His instruments must be scrupulously clean, & sharp. He
must be courageous and compassionate, if not by nature,
then by self discipline.

— Dawood Al-Antaki.

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Indian Journal of Surgery

Vol. I]

NOVEMBER 1939

[No. 3

EDITORIAL

We are publishing today the third number of our Journal. It has been a struggle to do so.

It is very difficult for us to believe that in a vast country like India, with so many talented workers in the field, one cannot raise enough surgical material of sufficient interest to fill a paltry fifty pages in three months. Material there is, talent there is, observation there must be, good work is being done, yet we are starved for lack of papers. We feel that the explanation must be that there is apathy for our journal. There is not that feeling of kinship, as of something that is our own - of something which must be cherished and nourished.

We have introduced a new feature in this number and that is a commented translation from the Ayurveda. If this feature appeals to the members it will be continued. We shall be grateful if members will please convey their impressions to us.

We are grateful to all those who have helped us and sent us case reports. Mr Joglekar's cases are really interesting. The case of retroperitoneal dermoid is one of the puzzles, the abdomen often presents to us. The tablet shaped stones removed from the bladder are indeed a rarity, the notable point is that they were invisible to X-rays. The large stone in the kidney without marked symptoms, follows the usual rule for such large stones. One of us remembers a similar

case under the care of Mr Swift Joly, at St Peter's hospital, London, in which the stone was a cast of the kidney and the kidney was reduced to paper thickness and fitted closely over the stone like a glove, that patient had pyuria for a few months only. Mr Khwaja's case of Chorion-epithelioma of the testis is again a surgical rarity. We are grateful to Mr Khwaja for allowing us the opportunity to record this case.

Dr Kini has again sent in some interesting observations, this time regarding sublingual dermoids. Mr Bharucha has helped us by sending in his case report of a bilocular hydrocele. Mr Gadgil has taken the trouble of amplifying his remarks on pneumo-peritoneum made during the course of the discussion on ileo caecal tuberculosis published in our first number.

It has happened in this number that more than half the number of pages have been taken up by one writer. We are not in favour of this policy unless there is something very special to be said by the member. In the present case, the member cannot claim any such privilege. The present arrangement had to be sanctioned in order to get out this number of the journal in decent time. Waiting for other material to materialise might have meant a delay of two or three months. We can but hope that our fellow members will come to our rescue and prevent a recurrence of such a dilemma.

A CASE OF RETROPERITONEAL DERMOID CYST

By Mr S R Joglekar, F R C S, Surgeon, J J Hospital, Bombay

Keshava Sidwa, aged 45, male, farmer by occupation, living at Palghar

the swelling The swelling gets flatter on making the recti taut

COMPLAINT

Admitted for a generalised swelling of the abdomen

HISTORY

About 5 years ago he had an attack of loose motions for a period of 2 months with pain in the abdomen The pain subsided but the abdomen began increasing in size till it reached its present one He had bleeding per rectum for 15 days, one year ago, which stopped without treatment No history of enteric or pneumonia

During the last month he suffered from malaria for 15 days

PERSONAL HISTORY

Smokes moderately, drinks occasionally and lives on a mixed diet

FAMILY HISTORY

No relation of his has ever suffered from a similar complaint

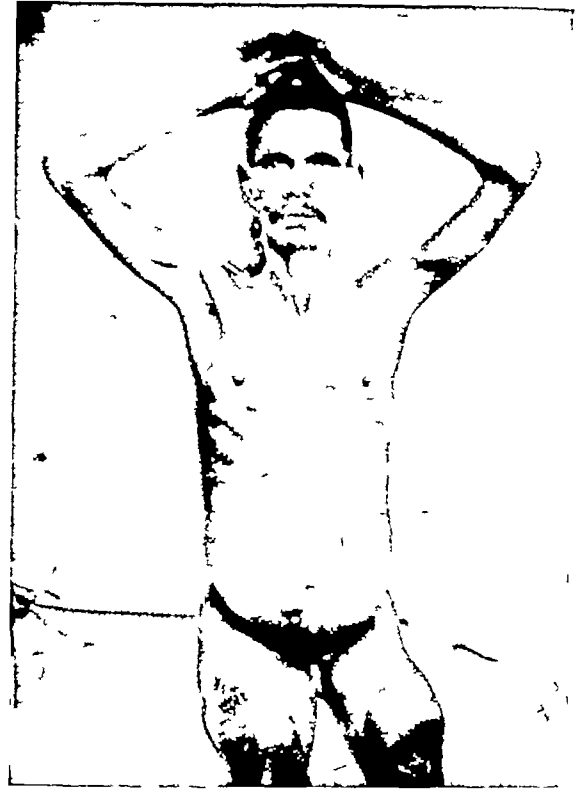
GENERAL EXAMINATION —He looks emaciated and says he has lost weight Mucous membranes and conjunctivae pale

LOCAL EXAMINATION

INSPECTION—There is a swelling in the abdomen, almost filling it up, which moves on respiration Round the umbilicus are seen multiple scars of branding

ON LYING DOWN—The swelling is intra-abdominal, more marked in the flanks and upper abdomen Surface of the swelling is irregular

ON STANDING—The swelling is more marked in the lower abdomen The veins get engorged over the abdomen Coils of intestine can be seen over the surface, of



Patient sitting up in bed

MENSURATION —Circumference of abdomen,—2 inches above umbilicus $31\frac{1}{2}$ At the umbilicus 30 inches 2 inches below umbilicus 28 inches

The umbilicus is equidistant from the anterior superior iliac spines (6 inches),

Distance of umbilicus from the xiphisternum $7\frac{1}{2}$ inches

Distance of umbilicus from the symphysis pubis $5\frac{1}{2}$ inches,

PALPATION—No pulsation can be felt over the swelling

The swelling has a peculiar feel It can be moulded and given various shapes by

applying pressure at various places over its surface. Hence it cannot be said to have any definite shape or surface. Its margins cannot be definitely made out. At places structures like the coils of intestine can be definitely palpated and gurgling felt, especially in the left hypochondrium and the left lumbar region.

Liver, gall-bladder and spleen not palpable. The swelling is not related to the urinary bladder, liver, gall-bladder or the spleen.

The swelling does not go down after catheterisation, or purging and subsequent starvation for a few days.

PERCUSSION

The swelling is dull all over and round about the umbilicus the dullness is in the form of a circle and not in that of a horse-shoe. The dullness over the swelling is not continuous with the liver or spleen dullness.

Bands of resonance can be elicited at places during the examination. No shifting dullness present.

AUSCULTATION

Gurgling is heard at various places over the swelling.

DIGITAL RECTAL EXAMINATION

No abnormality is detected.

CHEST

Heart—Heart sounds feeble.

Lungs—Crepitations at the left base.

NERVOUS SYSTEM —

No abnormality is detected.

SPINE, TESTES AND EXTERNAL HERNIAL ORIFICES

Normal.

BLOOD PRESSURE —

Systolic 80 mm of Hg Diastolic 50 mm of Hg.

LABORATORY INVESTIGATIONS,

BLOOD —

Ped Elood corpuscles 6,200,000, per c mm

White Elood Corpuscles 7,300, per c mm

Haemoglobin 80%

Colour index 64%

Differential count

Polymorphs 56%

Lymphocytes 41%

Large mono 2%

Eosinophiles 1%

Van den Bergh—negative

Wassermann reaction negative

X RAY INVESTIGATIONS

BARIUM MEAL

At 8 hours barium meal in ascending colon and caecum. A large amount in the ileal coils. Caecum and ascending colon displaced to the right.

At 10 hours barium meal at splenic flexure,

BARIUM ENEMA

The large gut shows nothing abnormal excepting that the splenic flexure is displaced to the right.

X—RAY CHEST

After screening shows no abnormality, no secondaries. Heart and lungs, Normal in size.

OPERATION NOTES (14-2-39)

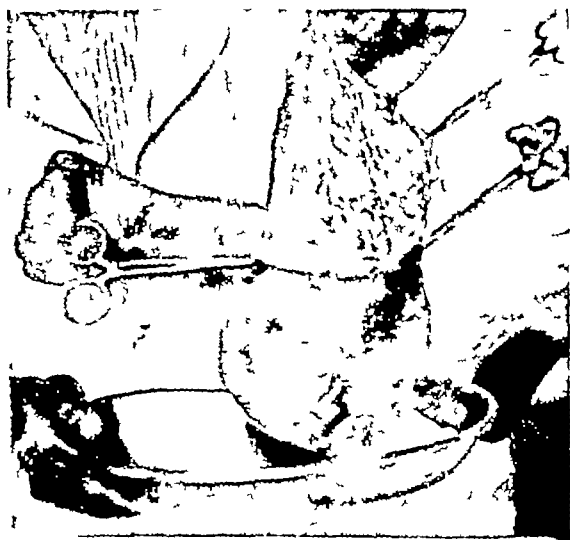
Anaesthesia spinal 25 ccs of 6% novocain intrathecally.

INCISION —

Right paramedian. The rectus retracted laterally and the peritoneum opened up.

A huge swelling about 12 inches X 10 inches X 10 inches showed itself in the central area, it appeared to be contained in

the transverse meso colon with the transverse colon lying at the top and the descending colon lying obliquely in front of it. At this stage a suspicion of its being a pseudo pancreatic cyst was raised. The whole of the large intestine was occupying exactly the same position as was seen in the barium X-ray. The small intestines lay on either side of the swelling. The liver, gall-bladder and spleen were palpated and found to be normal. The area surrounding the tumour was packed with towels wrung out of hot saline and an attempt was made to aspirate the contents of the tumour. This was impossible, and a small nick was made in it with a knife. The contents appeared to be yellowish putty-like material. The incision was enlarged and the tumour partially emptied of its contents. It was next separated from the posterior layer of the parietal peritoneum and the inferior layer of the transverse meso-colon which was lying anterior to it. The tumour was next delivered. The pedicle containing the feeding vessels was in the angle between the aorta and the left renal artery. This was ligatured as also some bleeding points in the vicinity. The tumour was now removed.

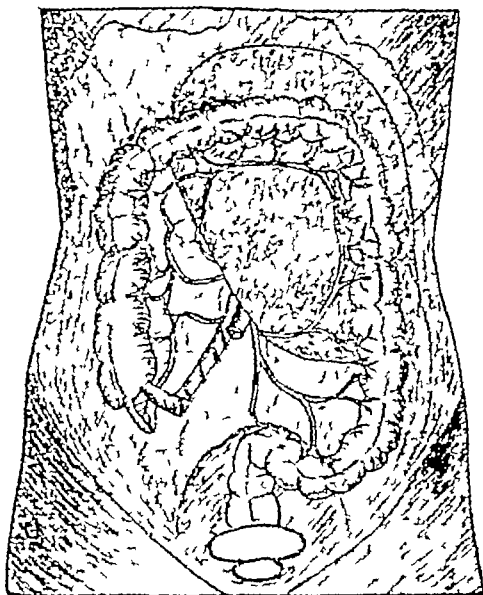


Shows the partially emptied cyst after removal

The posterior layer of the parietal peritoneum was repaired with a continuous catgut suture. Hot saline was poured in the peritoneal cavity. All the abdominal viscera were found to be smaller in size. The abdomen was now closed in layers.



Shows the pultaceous material escaping from the cyst



Shows relations of the cyst as found at operation

POST OPERATIVE PROGRESS

The sutures were removed on the 7th day but a portion of the wound gave way. The wound was closed up again. The sutures were next removed on the 11th day of the resuture.

THE PATHOLOGICAL REPORT

Specimen shows a cyst 12"X9" 5 kilos in weight The cyst contains thick greyish yellow granular sebaceous material Both the surfaces of the cyst are smooth and blood vessels of various sizes are seen coursing in the wall in all directions The wall is fibrous and in some places it is faintly translucent

THE WALL

The sections show the wall to consist of from without inwards

- i Loose connective tissue containing blood vessels
- ii A layer of bundles of involuntary muscle fibres in some places
- iii A layer of fibrous tissue in some places
- iv A layer of elastic tissue in some places
- v Stratified squamous epithelium with papillary projections of the same in the cavity of the cyst



Shows scar of the operation

INTESTINAL TUBERCULOSIS—ITS TREATMENT WITH SPECIAL REFERENCES TO PNEUMOPERITONEUM

By Mr S B Gadgil, F R C S, Bombay

I need not go into the symptomatology of this disease nor into the pathology which varies in different cases, as any part of the intestine may be attacked by the tubercle bacilli

Its treatment is the most important part from the surgeon's point of view The aims of treatment viz removal of the cause and removal of the damaged portion will always be kept in view where possible, but unfortunately it has not been possible to

carry on the treatment on these lines In the case of intestinal tuberculosis, our main efforts being to increase the tissue resistance, relieve the symptoms and thus again rebuild the body

Several modes of treatment have been adopted to carry out these aims and a short resume of the same would be given here

(1) Dietary—A bland diet rich in caloric value with a fair amount of animal proteins has been recommended Raw fruit or vege-

tables containing too much cellulose are liable to cause ulceration. The diet must never be too much at a time. Any diet which disagrees must be stopped at once. Pneumoperitoneum helps patients to digest meats which they were unable to do before.

(2) Drugs—Cod liver oil, parathyroid, salol and its derivatives have all been tried with varying results, but belladonna, bismuth and barium salts have marked soothing effect on the intestinal tract.

Intravenous calcium therapy has had a vogue for a number of years and no statistics are available in this country. Some physicians seem to have great faith in this mode of treatment. One may say it has never proved either infallible or damaging to the patient.

(3) Heliotherapy—Ultraviolet light exposures have given good results in a large number of cases and in my early medical practice it was a common thing to rub the abdomen with a weak iodoform ointment and expose the part to sunrays for a couple of hours each day. Other modes of treatment were carried out at the same time so that one cannot say that the results were solely due to heliotherapy. Ultraviolet rays treatment for all its popularity is an expensive mode of treatment, which can be made available only in the case of rich people.

(4) Vitamin therapy—McConkey started treating intestinal tuberculosis by a high vitamin dietary and it is certainly a great advance in successfully treating intestinal tuberculosis. Cod liver oil should be given liberally with a mixture of orange juice or tomato juice to make it agreeable. Hundreds of other vitamin preparations are on the market but one has to find out for oneself which is the most agreeable.

(5) Surgery has been quite necessary in cases of stenosis. This complication shows it-

self in advanced cases and surgery in the form of excision of the lesions generally hastens the end. Even the best surgical risks where the disease is localised to the appendix and the caecum, as the hypertrophic form, after excision will recur in other parts of the intestine. Still surgery has an important role in the treatment of intestinal tuberculosis.

(6) Another form of surgery besides anastomosis and excision consists in inducing pneumoperitoneum in the patient. In the later part of the last century it was very much in vogue. I have had some excellent results by merely opening up the abdomen, letting in air and sunlight. Marked improvement was noticed. Drainage always proved fatal.

American surgeons have developed this idea further. They introduce oxygen by a puncture in the middle line a little above the umbilicus and thus introduce oxygen in the peritoneum. The guts have to be thoroughly emptied by an enema.

I am giving below a few points in the technic which I have gleaned from the American literature on the subject.

- 1 The puncture should be made between two meals
- 2 Bowels should be thoroughly empty
- 3 Bladder must be evacuated before
- 4 Pituitrin should be administered
- 5 Sedatives must be given in a nervous patient
- 6 Novocain to be used for local anaesthesia
- 7 Ordinary pneumothorax needle is used and not more than 500 c c of air or oxygen introduced at a time

Subjective symptoms noticed after the pneumoperitoneum are

- 1 Sense of lightness in the epigastrium
- 2 Pain in both shoulders and back
- 3 A few symptoms of peritonism for three to four days

Aspirin relieves the pain in these cases. In cases successfully treated by this method there is loss of liver dullness and diminution of diaphragmatic movements.

It has been found that spasmodic pain, flatulence, anorexia, and cramps are symptoms very much relieved. The triad of symptoms in ileo caecal tuberculosis viz constipation, cramps and pain in the right lower quadrant disappears. Diarrhoea is the only symptom which is not relieved much. Intestinal haemorrhage is not at all arrested.

Patient begins to get back his appetite. Milk, eggs, fruit are well tolerated. Refills have to be given whenever symptoms reappear.

THEORIES OF PNEUMOPERITONEUM

1 Mechanical effects—Pneumoperitoneum increases the intra abdominal pressure, separates adhesions and diminishes irritation by preventing serous membranes rubbing against each other. It may also cause displacement of some abdominal viscera.

2 Vascular effects—Relief of the capillary stasis in the intestine. Hyperaemia is caused by the oxygen introduced. Increased

cellular activity is also promoted by the oxygen administered.

3 It also stimulates the formation of antibodies.

Pneumoperitoneum certainly has been useful as an antispasmodic in salpingitis and intestinal spasms as shown by symptoms and X-Rays. Atropine and belladonna help this antispasmodic action.

The result after two or three refills lasts for eight to ten years. Hydrochloric acid in the stomach is increased and post mortems in American hospitals show no spread of disease where this treatment has been carried out.

In short the treatment of intestinal tuberculosis does not vary much as compared with the treatment of pulmonary tuberculosis at the present time.

Drugs like calcium and cod liver oil are of secondary importance in themselves but very useful with other forms of treatment. Surgery has a limited scope in this disease. Ultraviolet treatment benefits about 40% of cases as regards relief of symptoms.

Vitamins are also useful but pneumoperitoneum will certainly benefit 75% of intestinal tuberculosis cases. I have to acknowledge the advice and information I received from American writers in their Journal on Tuberculosis.

A CASE OF MULTIPLE VESICAL CALCULI

Under the care of Mr S R Joglekar, F. R. C. S., Surgeon, J J Hospital, Bombay

Patients name —Krishnaji Palande

Age —50 Sex —Male Religion —Hindu
Occupation —Cook

Patient was admitted into Hospital on 20-5-35 for pain and a tender swelling in the hypogastrium-

PREVIOUS HISTORY —According to the patient, the history was of only one month's duration. The complaint started with pain in the hypogastrium and difficulty of micturition and the swelling gradually increased till it reached upto the umbilicus. The frequency of micturition increased to $\frac{D 10}{N 10}$ but the total quantity passed was not much altered. After micturition, the hypogastric swelling became somewhat smaller,

PAST HISTORY —Elicited but was of no significance

PHYSICAL EXAMINATION —A tender swelling fluctuating and dull on percussion in the hypogastrium extending upto the umbilicus. On passing a catheter 12 ozs of blood stained urine was withdrawn. Rectal examination revealed a big prostate, the right lobe harder and larger than the left. The upper limit could not be reached with the examining finger.

X-ray photo did not show any calculus

URINE —Reaction — Alkaline, Albumen and pus present microscopically, heavy deposit of pus cells & R B C s. Urea—0.8%

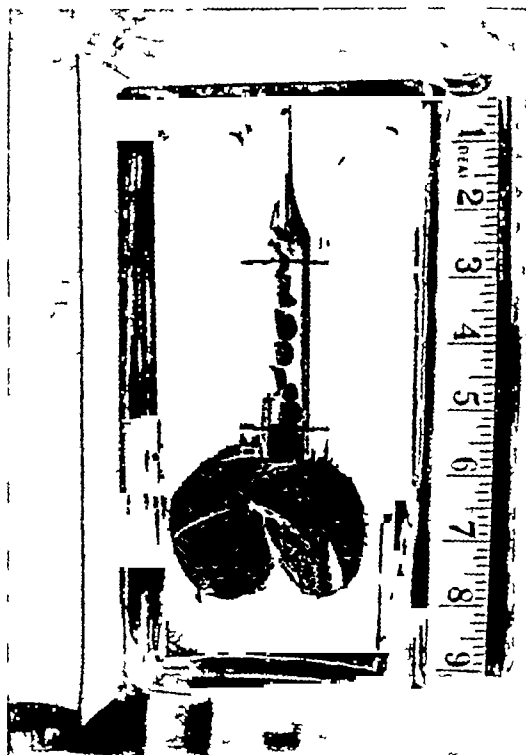
Urea concentration Test - 1st hour 1.2%, 2nd hour 1.4%, third hour 2%

BLOOD UREA —120 mgms

OPERATION —24-5-38 Spinal anaesthesia. The bladder was opened suprapubi-

cally and on putting the finger inside, twelve calculi of the shape and size of aspirin or quinine tablets were felt and removed. The bladder was drained through a rubber tube.

On 21-6-35, the kidney function had improved, the bladder was opened again and the enlarged prostate removed. It was about the size of a tennis ball. Another tablet calculus was also removed. The patient's convalescence after the second operation was rather stormy and at one period, a large bladder hematoma had to be evacuated. But ultimately he made a good recovery and was discharged cured on 31-7-35.



Prostate & Calculi removed from the case described above

A CASE OF RENAL & URETERAL CALCULUS

Under the care of Mr S R Joglekar, F R C S, Surgeon, J J Hospital, Bombay

Patient's Name —Yusufshah

Age — 30 Occupation — Watchman

Sex —Male Religion — Mohamedan, Caste Pathan

Admitted --19-7-35 Discharged--4-10-35

COMPLAINT —Attacks of pain in the left loin and back, not radiating towards groin or testes, for the last 20 years, practically since childhood

HISTORY OF PRESENT COMPLAINT — Ever since the patient remembers he is having attacks of pain in the back. In the beginning, the attacks used to be only 3 or 4 times a year. The frequency and duration of these attacks increased gradually and at the time of admission the colicky pains came on every month and lasted for about 8 or 10 days. The tenderness and soreness in the left lumbar region is constant. He had an attack of retention of urine about 13 years ago which was relieved after passing a small stone per urethram. On one occasion, he had marked hematuria. Ordinarily he has not noticed blood in the urine.

PAST ILLNESS —Of no particular importance except an attack of urethritis (? Gonorrhoea). He is however not definite about its onset, duration, etc.

FAMILY HISTORY —Elicited but of no particular significance

PHYSICAL EXAMINATION —Patient is well nourished and well built Cardio-vascular, nervous and respiratory systems normal

Blood pressure $\frac{120 \text{ m m}}{70 \text{ m m}}$

Abdominal examination reveals nothing abnormal except a palpable and tender left kidney

X-ray revealed an enormous stone (Branched) in the left kidney and a large stone in the pelvic part of the left ureter



Stone in left kidney

Urine examination (20-7-35)

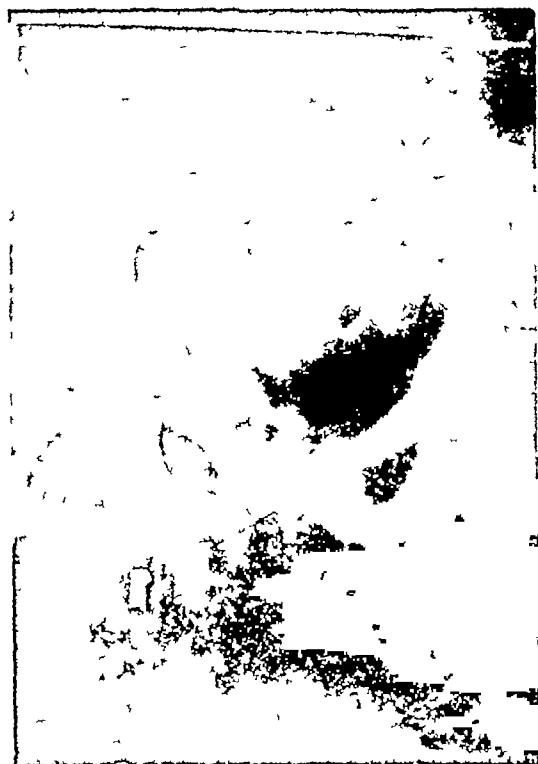
Albumen —Trace

Pus —present in fair quantity

Urea —2%

Urine culture showed presence of B. Coli

Blood examination —Nil abnormal
Bleeding time 25 m. —coagulation time 4 m.



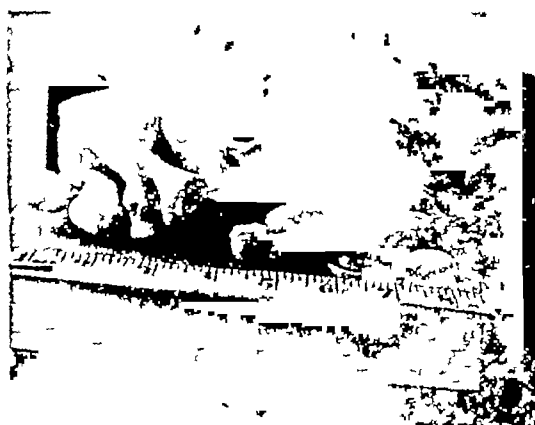
Stone in left ureter near the vesical orifice

Blood urea — 35 mgms

1st Operation — 26-7-35 Under spinal anaesthesia the left kidney was exposed through a lumbar incision, and after separating adhesions which were dense in parts the kidney and a few inches of the ureter were removed. The patient stood the operation well and apart from some distension on the second day, his recovery was uninterrupted.

The weight of the specimen removed was 15 ounces. The kidney was split open and the stone removed was seen to be

pure white in colour, obviously composed of phosphates and weighed six ounces when dry. The size was — length 11 cm Breadth 8 cm Thickness 5 cm



2nd Operation — 6-9-35 Spinal anaesthesia Through a midline subumbilical incision, the bladder and the left ureter were exposed extraperitoneally and the stone impacted in the left ureter about 2" above the vesical opening was removed. This stone was black in colour probably from admixture of blood pigments. The size was $3 \times 2 \times 1.5$ cms and the shape was that of a date stone. After the second operation, there was rise of temperature upto 100° F for about 4 days but otherwise the convalescence was uneventful and the patient was discharged cured on 4-10-38.

When last seen about 6 months ago, the patient was in good health and had got rid of all his pain and colicky attacks.

ACUTE APPENDICITIS.

By S R Moolgavkar, F R C S

Professor of Surgery, Grant Medical College, Surgeon, J J Hospital, Bombay

Lecture delivered during the refresher course at the J J Hospital on 28th Oct. 1939

I intend to talk to you about acute appendicitis, a subject which has been worn almost threadbare by repeated handling

ANATOMY

Appendicitis necessarily means an inflammation of the appendix. The appendix is a narrow blind tube. Ordinarily it is about 3 inches long but I have removed one 9 inches long. The longer such a tube is, the more likely it is that it cannot be completely emptied, also a long tube is much more likely to get twisted or kinked.

Its wall consists of the usual coats of the bowel, viz mucous, muscular and serous.

The mucous coat is peculiar in that it contains a great deal more lymphoid tissue and follicles than is usual in the large bowel. The mucous membrane is thus more likely to be the seat of infection and as the lymphoid tissue is most active up to about 30 years of age this cause of predisposition to appendicitis operates most during that period.

The muscular coat is in two layers, inner circular and outer longitudinal. The longitudinal coat is evenly distributed and is not in bands or teniae as is the case with the colon. There is nothing special about the circular coat. Blood vessels perforate these coats to reach the mucosa, thus forming small channels along which infection from the mucous membrane can reach the outside of the appendix without destruction or even gross involvement of the muscular coats.

The peritoneal coat of the appendix is as a rule as complete as that of the small

intestine, the appendix being normally provided with a mesentery. During development the caecum and the appendix swing over from over the midline to the right and finally descend and reach the right iliac fossa. It happens sometimes that during this swing the appendix gets stuck to some structure on the posterior abdominal wall along its course and then we have a retro-colic or retro-caecal appendix. I have found appendices which had to be detached from the posterior inferior part of the liver. The peritoneal coat in such cases disappears excepting in those with a retro-caecal position, where the coat may be present to a greater or lesser extent. In these cases when the peritoneal investment is not complete it is absent in the distal portions of the appendix. The importance of the presence or absence of the peritoneal coat lies in the fact that with a peritoneal covering, appendicitis may lead to peritonitis, whereas its absence may lead to a severe and serious cellulitis.

The blood supply of the appendix is derived from the posterior branch of the ileo-colic artery. This appendicular artery lies along the free border of the meso-appendix and ends a little short of the tip. As a result of the presence of the meso-appendix the appendix is freely moveable but it often happens—and this is seen often among the cases that are operated on for appendicitis—that the meso-appendix is absent as an entity for the first inch or more. The result of this arrangement is that the appendix is bound down to the posterior abdominal wall for an inch or more. One may compare the ordinary appendix with a complete meso-appendix to a free finger,

whereas the variety I have mentioned above may be compared to the finger of a hand laid with its dorsum on the table and with the first phalanx of the finger held down firmly Here the first phalanx cannot move, whereas the second and third phalanges can move freely One can see that kinks and obstructions are more likely to develop in such an appendix The cause of such a condition is in my opinion a congenital shortness of the proximal branches of the appendicular artery, because as soon as the artery is ligatured and divided the appendix becomes as free as a normal one and all kinks disappear I have seen this happen repeatedly during operations

We know very little about the physiology of the appendix This much one can say and that is, that its removal leads to no recognisable ill effects

PATHOLOGY

Turning now to the pathology of appendicitis the immediate cause is an infection of the mucous membrane by a germ This germ most frequently is the streptococcus Whether there is a specific variety of the streptococcus which causes appendicitis, it is very difficult to say and for us it does not really matter Other organisms also take part such as the bacillus coli and anaerobic organisms but these are probably secondary to the streptococcus Grossly they make their presence known to us by the foul smell and gas formation

How are these germs brought to the appendix? The usual rules of continuity, blood, and lymph stream infection are also applicable to the appendix Even though it is quite possible that blood and lymph may bring bacteria to the appendix it must be very very rare indeed that this causes infection here, because if infection were common in this way we would find that the initial lesion was often intramural, that is in the substance

of the wall of the appendix We find however that the initial lesions are invariably in the mucous membrane, and, when the whole wall is involved, that they are most advanced in the mucous membrane The bacteria are therefore derived by continuity from the large bowel

It is a well known fact that bacteria which normally cause no trouble, become very virulent as soon as there is any obstruction to the flow of the intestinal contents The appendix is no exception to this rule, in fact, because of its being a blind tube it can form a complete "closed loop" Any kink however caused, any obstruction to the lumen caused by an outside agency like a band or a luminal agency like a faecalith or other foreign body or even the extension of a catarrh from the caecum whether it be the result of constipation or diarrhoea is enough to set up this obstruction to the flow of the appendicular contents This leads to increased virulence of the organisms which are already present within the lumen of the appendix. Often perhaps this does not lead to infection but in some cases infection does take place When this occurs inflammation naturally follows This leads to a swelling of the mucous membrane and to a lesser extent of the muscular coats and serosa This swelling leads to further and more complete obstruction There is a piling up of the appendicular secretions and exudates

CLINICAL SIGNS

It is at this stage that clinical signs become manifest and the first clinical sign most often is pain This pain is caused by the tension within the appendix and following the rule, that all midgut painful lesions—so long as they are confined to the viscus alone—are referred to the umbilicus the pain of appendicitis is first felt here This tension also causes vomiting particularly in the more acute type of case where the

tension is more marked. Fever and its concomitants are the accompaniments of infection and inflammation. As occurs in most other infections, the fever and increased pulse are more marked in children.

GANGRENE

The inflammation spreads towards the surface by continuity and its spread is helped by the channels which exist for the passage of the blood vessels. Sometimes the inflammation is so severe that gangrene of the mucous membrane occurs and this gangrene may spread to the overlying muscular and serous coats. In other cases the acute inflammation spreads so rapidly that the blood vessels not only in the appendicular wall but even in the meso-appendix are thrombosed. This is sometimes seen very well in cases of very acute appendicitis operated on between 18 to 36 hours after its commencement. The meso-appendix here is so swollen and friable that it is impossible to ligature it *en masse*, the ligatures cutting through and yet such divided meso-appendix does not bleed. The veins are invariably filled with a black clot. Exceptionally an artery might be found spurting feebly. Gangrene of the whole appendix is inevitable under these conditions.

RIGHT ILIAC PAIN

The clinical signs are changed as soon as the inflammation reaches the serous coat. We have now a little peritonitis which soon spreads to the parietal peritoneum. The pain now becomes localised over inflamed parietal peritoneum viz over the right iliac fossa. If the peritonitis persists for a few hours we have a protective mechanism brought into operation namely the tonic contraction of the abdominal muscles overlying this area in order to minimise movement of the part. We thus have the physical sign of rigidity developing. The pain persists so long as

the tension within the appendix persists and it often is of a colicky nature because of peristalsis in the appendix.

PERFORATION

The tension may be relieved by a gradual subsidence of the inflammation or it may be suddenly relieved by the bursting of the appendix at a weak spot—usually where a fecalith has caused ulceration and later gangrene, or the appendix may go gangrenous and perforate near its tip where the blood supply is not so rich. I must here say that of the perforations of the appendix I have seen, those over a foreign body are much the commonest. Perforation of the tip is quite the exception. The clinical signs closely follow the pathology. The pain subsides slowly in those cases which are resolving, whereas in cases of perforation the pain ceases rather suddenly. This latter then is a symptom of grave import and demands immediate intervention. It has been noted that perforation is encouraged by the administration of purgatives because they necessarily lead to increased peristalsis in the bowel in which the appendix naturally participates. It is on this, that the rule you follow namely never to administer a purgative in cases of abdominal pain, till appendicitis also is excluded, is based.

Once gangrene of all the coats or perforation of the appendix has occurred the inflammatory process cannot retrogress till the bacteria which have now reached the peritoneal cavity through the gangrenous patch, or through the products of infection and inflammation—discharged into the cavity as a result of perforation, are dealt with.

PERITONITIS

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tion of serous membranes differs fundamentally in no way from inflammation in other tissues but when we open an abdomen for an inflammatory lesion, we often see a very striking picture in the form of masses of yellow fibrin which are sticking coils of the bowel to each other and to the parietes. This fibrin or "lymph" as it is called also forms in other inflammations like cellulitis but it is not evident to the naked eye for the simple reason that the fibrils are disposed among the cellular elements. Of course its presence can easily be demonstrated in microscopic sections by suitable staining. In cellulitis the tissues are swollen as a result of the exudation of plasma which resolves into fibrin and serum. In peritonitis exactly the same thing occurs but because the exudation of the plasma occurs in a cavity we can see the fibrin as lymph and the serum as free peritoneal fluid. In both situations the fibrin attempts to form a mechanical barrier against the further spread of infection. In the peritoneum we see this very well because the fibrin is so obvious. The fibrin as such cannot have any devitalising effect on the invading bacteria, because, it is, so far as the body is concerned, dead material. But by binding together the coils of the bowel to each other and to the parietes it does very materially help to limit the diffusion of bacteria and their poisons which are mixed with the fluid that forms at the same time.

ROLE OF THE OMENTUM

While we are considering the mechanical limitation of infection we cannot overlook the omentum which has aptly being called the "Policeman of the abdomen". It does not matter whether the inflammation is in the pelvis or in the gall bladder or in either flank. The omentum finds its way there. How does it do it? The omentum contains no muscle, voluntary or involuntary by which it can wriggle into place. We know that it is formed of layers of peritoneum, together with some fat and many blood

vessels. I have explained to my students this ubiquity of the omentum in the following manner -- As the inflammation spreads, the peritoneum covering the loops of intestine in the neighbourhood also gets inflamed. We may take it as a dictum that intestine whose mucous coat is being irritated shows marked peristalsis while intestine whose serous coat is inflamed gets paralysed. The object is obvious. In one case it wants to get rid of irritating contents and in the other it does not want to damage a swollen and softened serous coat by movement. Well, under these conditions the bowel in the neighbourhood of the appendix has its movements diminished or stopped, as a result of peritoneal inflammation whereas the remainder of the bowel is still quite active. The omentum which is lying in front of the bowels is gradually shifted or pushed by the active intestine into the more quiescent area and while lying there gets fixed into position by the fibrin which forms. Quite apart from the mechanical plug action of the omentum, it must be very useful in the inflamed area as it contains a good few arteries of respectable size, a fact which can easily be seen when the omentum has to be divided for any reason. The vascularity must be very useful in bringing more stores in the shape of plasma and leucocytes to the fighting zone. The result of all this is that a vigorous attempt is made to limit the spread of infection. Very often this succeeds and an abscess forms.

ABSCESS

From the clinical point of view the formation of an abscess gives rise to fullness and resistance in addition to the rigidity in the right iliac fossa. There is pain but now not so marked as before. There is tenderness. P V or P R the matting together of the bowels gives rise to a certain increase of resistance and tenderness on the right side whereas when an abscess forms in the

pelvis a definite lump can be made out. These latter are not so common however.

Even at this stage the process may be brought to an end by the bodily forces. But sometimes the process goes on extending and the abscess gets bigger and bigger by solution of the lymph in immediate contact with the pus and deposition of more lymph beyond. Such abscesses may reach quite a large size. I remember a case of a boy of 12 who had an appendicular abscess which filled the right iliac and both hypogastric regions completely and encroached upon the umbilical and left iliac regions. This boy was ill for two months before I saw him and after incision more than 2 pints of foul pus escaped. An abscess which is increasing in size is a serious danger and demands early attention because there is the ever present risk of the abscess bursting into and rapidly infecting the whole peritoneal cavity. There is only one end in such catastrophes.

General peritoneal infection may also arise without the initial stage of abscess formation. The perforated appendix may discharge such virulent material that no local defence is possible and the infection spreads inexorably, often in spite of all one may do. The spread is quite typical and can easily be followed by the rigidity of the overlying muscles from the right iliac fossa to the right hypogastrium, then the left hypogastrium followed by the left iliac fossa. Then it rises rapidly in horizontal lines till it reaches the epigastrium between 3 to 4 days of the perforation. The bowel is paralysed and distended and the abdomen rises from fullness to marked distention with hardly any movement on respiration. The breathing is mainly costal, hurried and shallow, the pulse fast and of small volume, the tongue dry and brown, with incessant vomiting of small quantities of dark brown fluid of a peculiar nauseating odour—signs heralding early death.

RETRO-COLIC APPENDIX

We have been considering so far appendicitis in an appendix covered over by peritoneum and contained within the peritoneal cavity. The retro colic appendix when inflamed is much more difficult to diagnose. The appendix is extra-peritoneal and is closely applied to the posterior aspect of the colon and not rarely is bound down by fasciae. Often the blood supply is by means of numerous small branches rather than by a definite appendicular artery. When the appendix is firmly bound to the colon and an abscess forms it has every chance of bursting into the colon and nothing much happens beyond pain in the right loin and fever for a few days. In those cases where the appendix is not so firmly bound down—and such cases are the more numerous in the retro-colic variety—a perforating or gangrenous appendix infects the loose cellular tissue behind the colon and retro colic, perinephric or sub-diaphragmatic cellulitis or abscess is the result. When the abscess forms in close connection with the psoas, tonic contraction, with consequent flexion at the hip joint is not an uncommon sign. These inflammations being in the cellular tissue, absorption of toxins is more rapid and marked and the patient is highly toxæmic with high fever and delirium, and may even die quite early.

I have tried above to co-relate the physical signs and symptoms to the pathology as it develops.

VALUE OF TENDERNESS

The one sign I want to emphasise is tenderness. The classical point of maximum tenderness is MacBurney's point. Now, this is really not a point at all. MacBurney defined the tenderness as lying on the right spino-umbilical line anywhere between one and a half to two and a half inches from the anterior superior spine. As you all

know this does not correspond to any particular anatomical structure. I do not like to diagnose a case as appendicitis unless I elicit this tenderness

It is worthy of note that tenderness over MacBurney's point is absent in those deceptive cases of pneumonia which simulate appendicitis by the referred pain in the right iliac fossa

Pain in the right iliac fossa can also be elicited by pressure over descending colon, but this test requires the presence of gas in the colon (Rosenov's sign) The test depends on the pressure being transmitted by the gas to the caecum, which being distended moves, and causes movement and pain in the inflamed appendix It is never justifiable to inject air into the colon in order to elicit this sign, in cases of acute appendicitis (Eastedo's sign)

LEUCOCYTOSIS

If there is time and in all cases of doubt, I also like to do a W B C count In all inflammatory lesions the W B C count is increased I remember one case of a young girl of sixteen, with sudden severe pain in the right iliac fossa, with a temperature of 102, rapid pulse and vomiting, who had a W B C count of 5,700 I thought that she was not reacting well and urged an immediate operation At operation I found a congested appendix which I removed Two days later she developed a typical attack of measles I think that in this case the patient had mucous membrane lesions in the appendix similar to Koplik spots

X-RAYS

X rays have no place in the diagnosis of acute appendicitis, however much they may be used for diagnosing a chronic appendicitis

Rebound tenderness is another sign I do not like to apply in cases of acute

appendicitis As you know, in this test one exerts pressure over the right iliac fossa followed by sudden withdrawal of the hand, thus allowing a rapid movement of the inflamed appendix with consequent pain I feel that such pressure and its sudden release may displace the soft fibrin which has formed and thus lead to spread of infection

The hyperaesthesia test by means of a pencil or a pin drawn across, is useful as a confirmatory test

INCIDENCE

Appendicitis is a disease of all ages, my youngest patient was 6 years and oldest 63 years old It is however commonest during the second and third decades of life The distribution amongst the sexes is about equal Race has a certain amount of influence in so far as it affects diet I do believe that it is commoner in the non vegetarians I have seen gangrenous appendices much more in proportion amongst Europeans than amongst Indians

DIAGNOSIS

The diagnosis of acute appendicitis is not ordinarily difficult The story of a pain suddenly developing, at first felt round about the umbilicus and later localising in the right iliac fossa, accompanied often by a vomit or two, by fever and often constipation, with tenderness over MacBurney's point is usually typical enough The ordinary examination should always include either a P R or a P V In special cases W B C count is useful

DIFFERENTIAL DIAGNOSIS

Regarding differential diagnosis much can be said that is not of great value One can drag in anything from seminal vesiculitis to rheumatoid osteoarthritis but nothing much is to be gained from the discussion of all these I do not deny that it is possible

that mistakes might have been made even regarding such diseases or that these might have been diagnosed as appendicitis. But if attention is paid to the pathology and to the signs and symptoms produced therefrom the field of mistakes is narrowed considerably. I should point the particular possibilities as, renal or ureteral calculus, salpingitis, perforation of gastric or duodenal ulcers, and rupture of ectopic gestation.

Renal or ureteral calculus is often mistaken for acute appendicitis, naturally this applies only to a right sided stone. The pain is often severe and periodic enough in appendicitis to simulate renal calculus and indefinite enough in renal calculus to simulate acute appendicitis. If the appendix happens to lie in close relation to the ureter or bladder it is likely to cause frequency of micturation but this frequency is not so marked or the strangury so distressing as in cases of renal calculus. Sometimes confusion is promoted by the finding of a few R B C's in the urine, particularly in females. If the calculus happens to lie close to the appendix a certain amount of tenderness can be elicited at Mac Burney's point. The main points in favour of a stone are, marked frequency, strangury when present, no temperature, no leucocytosis, no rigidity. Of course the Xray is there to help us but before we invoke its help we must have our suspicions aroused.

Salpingitis is another condition which may mislead one. One usually finds that an acute salpingitis rises suddenly at the time of a period and then the period is cut short. There is marked tenderness and it may be very difficult to say whether it is or is not situated at Mac Burney's point. These cases are mistaken for the pelvic type of appendicitis, even a P V does not help us very much because the tenderness in the right fornix may be due to both, and a mass moveable with the uterus does not form at this early stage

as occurs later in salpingitis. The temperature in the case of salpingitis is usually higher. I should emphasise the following points. The presence of a discharge from the vagina for a longer or shorter period and the close connection of the attack with the menstrual period. There is higher temperature in salpingitis. If the salpingitis happens in a neurotic lady diagnosis is rendered very difficult indeed.

Perforation of a gastric or duodenal ulcer can be more easily excluded. The very sudden catastrophe accompanied by the board like rigidity of the upper abdomen is very characteristic of perforation. The only time when trouble in diagnosis is likely to arise is when, due to anatomical peculiarity or posture, the contents of the stomach are poured rapidly into the right paracolic gutter which lead to marked rigidity of the right iliac region. Here one point will always help you. The most marked tenderness is over the site of the perforation namely the epigastric region and not at Mac Burney's point. The temperature is likely to be initially depressed in cases of perforation and there will be a pulse of shock. The respirations are also markedly affected being very shallow, rapid and costal, in a few cases the hepatic dullness may be obliterated in both the axillary and mamillary lines.

In ruptured ectopic gestation a mistake is not very likely. The missed period followed by a sharp and sudden severe pain in the abdomen with collapse is a characteristic picture. There is no fever, no leucocytosis, no right iliac tenderness or rigidity. P V there is marked tenderness in the fornix and often a sense of resistance is felt quite early.

Pneumonias particularly the right basal type may lead to a suspicion of appendicitis by the referred pain in the right iliac fossa, but the lack of tenderness and rigidity, the presence of higher temperature and hurried

breathing and perhaps the working of the alae nasi should put you on your guard

Gall bladder trouble has its own history and train of symptoms

Spinal trouble causes more constant pain with exacerbations and not the sudden attack like appendicitis

Coronary thrombosis simulates a perforated gastric or duodenal ulcer more than appendicitis

TREATMENT

There are no two opinions regarding the treatment of acute appendicitis Removal of the appendix under these conditions is generally accepted The only difference of opinion is about, when to operate

If the case is seen during the first 24 hours of the attack one should operate at once Within this time it is exceptional for the inflammation to extend beyond the coats of the appendix There may be a few flakes of lymph on the appendix but serious involvement of the surrounding structures is not usual By removing the appendix at this stage one is not interfering with barriers thrown up by nature and the whole inflammatory lesion is removed in toto

If one comes across a case after 24 hours, one likes to see the case at least twice before coming to a definite conclusion The interval between the two examinations will depend on the nature of the case If the case appears to be very acute the interval should not be more than two hours and in any case not more than 6 hours The points to be observed particularly during the two examinations are the pulse and the local condition The pulse deserves special consideration and should be recorded every half hour If it shows a tendency to steadily increase even by a few beats, it is a strong argument for immediate operation The local condition also should be observed If

rigidity develops or extends between the two examinations that again is an argument for operation Marked colicky pain or sudden cessation of pain are also arguments in favour of operation

If the pulse remains steady or diminishes in frequency, if the local tenderness recedes, if rigidity remains the same or diminishes, if the tongue gets more moist, if the pain gets gradually less, these are all arguments in favour of withholding the knife and trying palliative treatment

OPERATION

I will not go into the details of the operation here I shall just say that I use spinal anaesthesia with novocain whenever I can, and I make a paramedian incision I use a pack to isolate the appendix area in all acute cases, and turn back a sero-muscular cuff from the base of the appendix, ligature the mucous tube as near the caecum as possible and after occluding it distally by means of an artery forceps applied but not clamped, divide it with a knife dipped in pure carbolic The sero-muscular cuff is then tied or sutured over the stump of the mucosa I use catgut throughout Drainage is used only when there is much sero purulent material round about and in all cases of perforated appendix In the latter case I drain by means of stab incisions, the right colic gutter and the pelvis I keep the tubes in as long as there is any quantity of pus coming through

APPENDICULAR ABSCESS

In those cases which were not operated on and then progress slowly towards a gradually increasing abscess, the only thing to be done is to open the abscess with the least disturbance possible and drain it I do not believe in disturbing natural barriers in order to get at the appendix. The appendix can always be removed later

APPENDICITIS WITH GENERALISED PERITONITIS

Appendicitis with generalised peritonitis is a very serious proposition indeed. After opening the abdomen, the appendix which is gangrenous or perforated should always be removed and as much of the free seropurulent material sucked or wiped away as possible. Drainage of the pelvis and of the colic gutters should be established by stab incisions, using 3/8" tubes. The pelvic tube should have numerous side perforations and should reach the bottom of Douglas' pouch. The tubes should be kept in as long as they discharge a fair quantity of pus. I have seen no obstruction or perforation of bowel result from keeping them in for 10-14 days. After the 4th day the tubes may be utilised for irrigation by means of a small rubber catheter passed through. The height of the irrigator should not be more than 2 feet above the bed. The lotion I use is Chlorogen, half an ounce to a pint of water. Sustainance of the strength of the patient is our most important duty. I have found a continuous intravenous drip of glucose solution, 10%, using from 4-6 litres, in 24 hours, very useful. I have continued this for days on end, in one case for 15 days. Cardiac stimulants through the drip or hypodermically are useful as also continuous administration of oxygen by a nasal tube. In those cases with incessant vomiting of dark brown material, a Ryle's tube passed through the other nostril and retained is most useful. When the patient is too toxic to operate, one knows the end is not far off.

INTERVAL OPERATIONS

In those cases which progress favourably and gradually subside, the appendix is removed after an interval of three weeks at least in order to allow complete subsidence of the inflammation. Those cases which had developed a small abscess and which have subsided and in those cases where the abscess has been drained, an interval of at least 3 months should be allowed to elapse. It is surprising to see the very few adhesions that are present after that length of time even when a large abscess has been opened. I believe that this result is due to the lymph which adheres to the serosa and protects a large number of endothelial cells from the damaging action of pus and toxins.

EXPECTANT TREATMENT

In those cases of acute appendicitis in which it is decided to wait, the treatment consists of the completest rest in bed in the Fowler position or with the head of the bed raised 18 inches, with fruit juice and glucose by mouth. This is supplemented by intravenous glucose and vitamin C if necessary. Internally sulphanilamide in some form is exhibited. Locally, alkaphlogistine or mag sulph paste with a hot water bottle or preferably an electric pad kept on continuously is very useful. Short wave therapy in the earlier stages may prove useful but this should be absolutely a bedside treatment. Enemas daily with sometimes a little emulsified paraffin by mouth is all that is necessary. Purgatives are to be avoided like poison.

REPORT OF A CASE OF CHORION-EPITHELIOMA OF THE TESTIS

By Mr H Y Khwaja, F R C S , Surgeon, J J Hospital, Bombay

INTRODUCTION —Chorioneplithelioma of the Testicle is perhaps the greatest curiosity in the whole of oncology 131 cases have been reported in the literature upto the end of 1932, in which, tissue morphologically identical with chorioneplithelioma of the uterus has been found The following case came under my observation which I am glad to report

ONSET AND CLINICAL COURSE—G V O a bus driver, Anglo Christian, aged 30 years, married, was admitted to the J J Hospital on 28.2.39 for haemoptysis, pain in the left side of the chest, loss of weight, anaemia and general weakness

In the month of January (about 7.1.39) he felt a tickling sensation in the throat and brought up a little blood, since that time he continued bringing up blood every day, about a drachm each time He complained of pain in the chest especially on the left side during deep breathing He had lost about 20 lbs in weight in a month

GENERAL EXAMINATION—Patient was well developed but looked washed out, nails pale, conjunctivae pale Glands and joints were normal

RESPIRATORY SYSTEM—Both sides of the chest moved well and T V F was normal On percussion patches of impaired resonance were noted On auscultation, the breathing was deficient with occasional crepitations on both sides posteriorly

CIRCULATORY SYSTEM—was normal

ALIMENTARY SYSTEM—Slight tenderness was found in the liver area and rigidity

hypochondriac region Spleen was not palpable

GENITO-URINARY SYSTEM was normal except for a swelling of the rt testicle for the past year The testis was enlarged and was the size of the large duck's egg The swelling was tense, smooth and regular and tenderness was elicited on pressure The cord was thickened but no other abnormality was detected in it The skin of the scrotum was freely moveable and no abnormal veins were detected

LABORATORY FINDINGS—Skiamogram of the chest showed extensive rounded opacities suggestive of secondary sarcomatous deposits in both the lungs W R - Blood examination revealed 3.2 millions R B C and 9000 W B C, B P was 128-80

OPERATION—The operation of orchidectomy was performed on 6.3.39 under spinal anaesthesia An incision was made in the inguinal region After the skin sup fascia and external oblique were divided the cord was isolated and ligatured at two points and divided as high up as the internal abdominal ring A finger was passed into the scrotum by the side of the cord and the testis with its coverings was separated, then the testis was delivered into the incision, brought out and removed The incision was closed in layers A drainage tube was put in through a stab wound in the scrotum There were no adhesions anywhere either to the testis or to the cord The structures of the cord were absolutely normal except for the enlargement of the veins of the pampiniform plexus The incision healed up within a week

MACROSCOPIC APPEARANCES OF THE SPECIMEN

The testis, with its epididymis and part of the cord was found to be uniformly enlarged to the size of a duck's egg Fig 1



Fig 1

Its cut surface showed replacement of its entire original texture by a soft and freely haemorrhagic friable growth, with dense mottling of the tissue, —its colour varying from a dirty grey to a dirty brown, and freely interspersed by lighter greyish-white irregular areas. Some areas showed evidence of breaking down and necrosis. A diagnosis of chorion epithelioma was made from naked eye appearances (Fig 2)

MICROSCOPIC REPORT

Sections showed syncytial masses of chorionic epithelium interspersed with haemorrhagic areas, characteristic of chorion epithelioma

On 16-3-39 the patient suddenly developed a catch on the right side of the chest and dyspnea. On examination

slightly deficient breath sounds were heard also crepitations, the percussion note being dull in patches. After exhibition of oxygen the dyspnea became less. Thereafter the patient felt a little better on saline and glucose till 5-4-39. The patient received deep X-ray therapy for his lung secondaries and he was progressing well except for extreme weakness and anaemia, when on the above date he began vomiting and could not retain anything. The vomits were of dark colour and of a foul odour. Continuous glucose saline per rectum was given and he felt better on 7-4-39. On 10-4-39, he suddenly became delirious and toxic without any rise of temperature. He developed a soft nodule on his head which after a few days broke down and had to be dressed. He received intravenous injections of glucose, and strychnine digitalin, hypodermically. He gradually came round and on 14-4-39 he said he felt much better. After a few hours he again relapsed and died on 15-4-39.

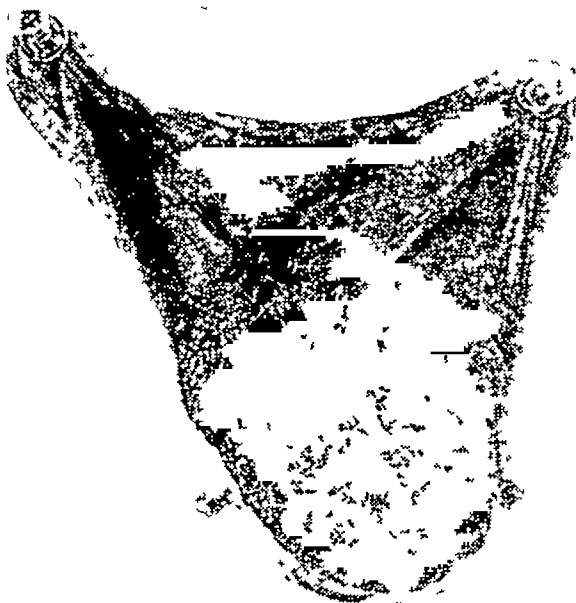


Fig 2

POST-MORTEM REPORT

On removing the sternum, it was found that its under surface was adherent to a

mass of friable hemorrhagic tissue, at the level of the fourth costal cartilage. This mass infiltrated the pleura and was adherent to the right lung.

On opening the abdomen, there was a purulent-looking fluid in the pelvis and a few adhesions between the loops of the intestine. The stomach showed two friable hemorrhagic nodules. There was an intussusception of the small intestine, seven feet from the duodeno-jejunal flexure, due to a dark cauliflower like growth, which was soft and hemorrhagic, springing from the mucosa. The liver was enlarged. A number of small nodules soft, hemorrhagic and friable were detected. The largest nodule was one cm in diameter. The spleen was larger than normal. The kidneys showed a number of very small hemorrhagic nodules under the capsule.

No lesion was detected in the heart. The lungs were massive and showed numerous nodules which were soft, friable and hemorrhagic. The right lung was adherent anteriorly as noted above.

There was a tumour in the right parietal region 1 x 1½ which was ulcerating. The right lobe of the cerebellum showed a hemorrhagic growth. Hemorrhagic growths were present at the tip of the right occipital lobe and also in both parietal lobes. On section, a number of small hemorrhagic growths were found scattered throughout the brain, the nodules being smaller than those found in the liver.

The bones showed no gross lesions or deformity on the surface, except the right parietal bone.

The lymphatic glands showed no lesions anywhere.

POST MORTEM DIAGNOSIS--Extensive secondaries due to chorion-epithelioma of the testis.

IMPORTANT LESIONS Secondaries in lungs, kidneys, liver, brain, scalp, stomach, small intestine. Sections of all show characters of Chorion-Carcinoma.

DISCUSSION

Although Marchand was the first to correctly describe and name chorion-epithelioma in the female, it was Schlägenhauser who in 1902 first reported a growth akin to chorion-epithelioma in a mixed tumour of the testis. He then examined material in the Vienna collection and found five cases each of undoubted hydatid mole and chorion-epithelioma, among the mixed tumours of the testes. He maintained that they were derived from teratomas and further postulated the presence of rudimentary fetal membranes in the original tumor. Those who support Schlägenhauser's hypothesis have been unable to produce any unequivocal evidence of fetal membranes in the primary tumour. R. T. Frank (1906) regarded the formation of chorion-epitheliomatous tissue merely as evidence of a metaplastic change in any embryonal ectodermic structure, which under certain unrecognized conditions is capable of producing this variety of tumour tissue. According to Adams this tumour should be classified as a blastoma, in preference to a teratoma, in as much as it represents a proliferation of an unipotent and not a bipotent cell. This view is not supported by others who maintain that the 'Chorion-epitheliomatous' tissue arises by metamorphosis of undifferentiated cells which also give rise to carcinoma and to teratomatous structures, these being pleuri-potential.

In reviewing the literature it becomes apparent, that these tumours of the testicle, morphologically, the equivalent of chorion-epithelioma of the uterus are in fact derived from teratoma, or from pleuri-

potential cells capable of giving rise to teratoma. Further it is a fact that these testicular tumours are associated with breast activity in the male and that recently two cases have been described in which the Asheim -- Zondek reaction was positive. These points have been held to show a physiological equivalency of these two tumours.

The cells of this tumour possess the unusual power of eroding the walls of the vessels and so reaching the blood stream. Secondaries in the lymphatic system, both glands and other tissue are conspicuously absent in the present case.

SUMMARY

- 1 A case of chorion-epithelioma of the right testis is described. The primary tumour was comparatively of a small size.

- 2 Haemoptysis was a predominant symptom.
- 3 Wide spread metastases were observed particularly in kidneys, lungs, liver, brain, scalp, intestine and stomach. Metastases were absent in the lymphatic system.
- 4 A conclusion is reached that the growth is essentially an expression of a process of differentiation of pluripotent cells.

I am indebted to Dr S S Ugrankar, M R C P for reference of this case to me and to Prof Gharpure for the post-mortem report.

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SUBLINGUAL DERMoids

By Mr M G Kini, M C, M B, M Ch (Orth), F R C S, Surgeon,
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Various congenital abnormalities may occur in the face and the neck as a result of irregularities in the closure of the branchial clefts giving rise to various types of tumours, clefts, fistulous tracts (branchial fistulae), lymphatic cysts, lymphangiomas, tubulo-dermoids and sub-lingual dermoids.

The pathology of the origin of the sub-lingual dermoid is purely speculative and it is presumed to arise as a result of the incomplete union of the two opposite portions of the first branchial arches leaving a triangular defect beneath the skin in the midline in the submental region which was the embryonal meso-branchial space of His. Portions of ectoderm thus remained adherent to the entoderm forming meso-branchial dermoid which lie at the base of the tongue laterally or in the middle line or may appear superficially in

the anterior part of the neck in the supra-hyoid region. These cysts are usually lined by epidermis and contain sebaceous material.

This type of cyst is rare and when it does occur it is found in the median or lateral aspects of the tongue or superficially in the supra-hyoid region. Often a sub-lingual dermoid is mistaken for a ranula and in some cases it becomes difficult to diagnose this condition except by histo-pathological and bio-chemical examination. Generally the ranula is small and translucent and when it assumes a large size it becomes difficult to diagnose it from a sub-lingual dermoid. (3) Sub-lingual dermoids are generally above the mylo-hyoid when under the anterior part of the tongue, but when they are situated laterally they are below the mylo-hyoid and point into the submaxillary triangle. The

superficial dermoids are usually in the supra-hyoid region in the midline or slightly laterally. The following three cases illustrate the three types of dermoids



Fig 1

(1) A case illustrating a sub-lingual dermoid on the lateral aspect of the tongue —

A Hindu male, aged 18, was admitted on 14-10-1932 with a swelling in the right sub-maxillary triangle. On opening the mouth the swelling became prominent inside the mouth lifting up the right side of the tongue and pushing it towards the left with a corresponding diminution of the size of the swelling in the sub-maxillary region. It was cystic to the feel, globular and not inflamed. Under local anaesthesia, this tumour was removed. On removing the cyst it was found to contain sebaceous material. Histopathological examination showed the structure of a dermoid cyst. (See fig 1) On

enquiry now it is found that he is completely cured

(2) A case illustrating a superficial dermoid in the midline of the neck in the supra-hyoid region —



Fig 2

A Hindu boy aged 10 years was admitted in 1938 with a small swelling in the supra-hyoid region in the midline, freely movable and cystic to the feel. It began as a small tumour of the size of a pin's head and gradually grew to the size of a big marble, as shown in the picture. It was diagnosed as a case of tubulo-dermoid and was removed. (See fig 2) On histopathological examination the lining membrane of the cyst was epidermis. On enquiry he reported after one year and has no recurrence of the trouble.

(3) A case illustrating a midline sub-lingual dermoid —

A Hindu female aged 20 years was admitted in 1939 for a swelling in the submen

tal region. On opening the mouth the swelling became prominent under the anterior part of the tongue which lifted the tongue upwards. She came for difficulty in phonation and in swallowing boluses of food. Under general anaesthesia with a submental

three ceses illustrate the three situations in which they are found



Fig 3 -

incision the mylo-hyoid was split in the mid-line and the cyst enucleated. The cyst contained sebaceous material and histopathological examination proved it to be a sub-lingual dermoid. (See fig 3 & 4) The histopathological section was identical with No 1. No reply has been received to a letter sent two months after operation.

POINTS OF INTEREST

Sub-lingual dermoids are rare and the



Fig 4

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A CASE OF BILOCULAR HYDROCELE

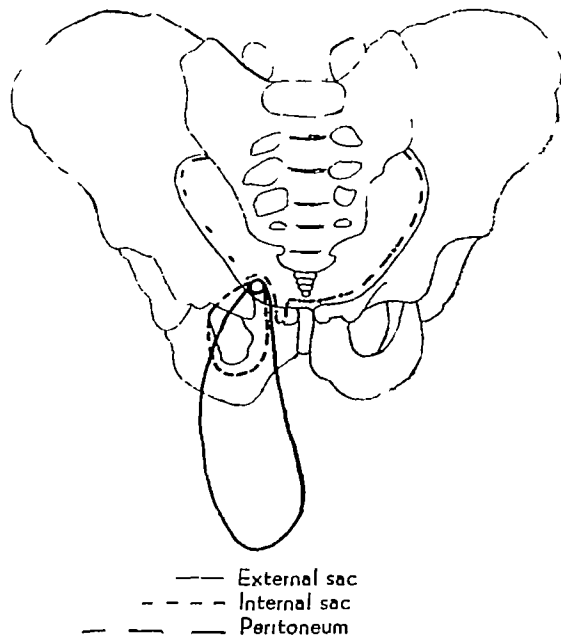
By Mr D R Bharucha, F R C S Honorary Surgeon, B D Petit Parsi General Hospital,
Honorary Assistant Surgeon, Sir J J Hospital, Bombay

C K a man of about 40 years came to the Sir J J Hospital with a right inguino scrotal swelling of 4 years' duration. It was six inches in length and about ten inches in circumference. It was soft, fluctuating and translucent but had a very distinct impulse on coughing. This impulse was both visible and palpable. Percussion gave a dull note. It could be reduced slightly on pressure. A mistaken diagnosis of right indirect inguinal hernia with a right hydrocele was made.

There being no contraindication, the patient after proper preparation was operated under spinal anaesthesia. A right inguino-scrotal incision was made extending into the upper one-third of the scrotum. The external oblique muscle was exposed and external abdominal ring defined. The aponeurosis of the external oblique was incised in the direction of its fibres, and the fibres of the cremaster muscle dealt with similarly and the spermatic cord exposed. The hydrocele sac was freed from its coverings and delivered out of the scrotum and incised. Clear straw coloured fluid was allowed to flow away till the sac was emptied. At this point it was noticed that there were no abdominal viscera in the sac and that attempts to vomit brought forth more fluid. After the sac had been apparently emptied. The incision in the sac was enlarged and at its upper part was found a circular opening about an inch in diameter situated at the middle of the inguinal canal. This led to a second intrapelvic but extraperitoneal lacuna containing over ten ounces of similar clear straw-coloured fluid.

By pulling on the extra-pelvic part of the sac and by blunt dissection, the intra-

pelvic part of the sac was gradually separated almost entirely. At the fundus the intrapelvic sac was extremely thin and friable and had to be removed piecemeal. The extrapelvic part of the sac was excised and the bleeding points caught and ligatured.



Medial to the neck of this bilocular hydrocele was found a small direct inguinal hernia. The sac was ligatured and excised and the hernia repaired in the usual manner.

A rubber drainage tube was kept in the scrotum for 48 hours. For the first four days after the operation the patient daily received 10 c c of calcium gluconate intravenously and 10 c c of coagulen 'Ciba' intramuscularly. The patient made an uninterrupted recovery and was discharged from the hospital after 15 days.

I wish to thank Mr V L Parmar, F R C S for permission to publish the notes of this case treated by me in his wards.

THE SURGICAL ASPECTS OF PILES IN AYURVEDA.

By Mr S R Moolgavkar, Bombay

One has always heard about the ancient Indian medical literature (Ayurveda) The names of Charaka, Sushruta and others were always names to conjure with Claims were and are always being made by vaidyas that there is nothing new in Western medicine and that in Ayurveda (The science of life) everything can be found, provided one but looks for it One cannot believe such exaggerated claims, and as many Sanskrit words have more than one meaning, depending on the context, it is possible to pull and stretch and twist meanings from words, which probably they were never intended to convey However that may be, I cannot claim such knowledge of the Ayurveda that I can criticise it with profit Curiosity however impelled me to utilise my scant knowledge of Sanskrit to explore a few avenues and I thought it best to confine myself for the time being to subjects of which I had some first hand knowledge The first subject I have selected is that dealing with अर्शस्, which according to Sushruta includes what we recognise today as piles and also fleshy growths like polypi and excrescences like warts I have looked through four books — three dealing with all the aspects of disease namely, Sushruta, Charaka and Wagbhatta and one dealing with the origin, signs, and symptoms only, namely, Madhavanidana This latter is apparently a compilation, as many of the verses are quoted, without change, from Sushruta and Charaka In the others the same meaning is often conveyed in greater or less detail, but by different words or construction The descriptions given in Sushruta so far as अर्शस् are concerned are the most clear, detailed and definite I have however quoted the source

when the original is not from Sushruta Nidanasthana or Chikitsasthana.

EMBRYOLOGY OF THE RECTUM

Soft structures like blood, flesh, marrow and rectum are derived from the mother (W Sh III 4)

As the skin forms on boiling milk, so seven skins form in the embryo Of these seven, the one called Maunsadhara (मासधरा) is the seat of abscess, fistula and piles (S, Sh IV 4)

Of the seven Kalas the fifth is called Pureeshadhara (पुरीषधरा). This separates the nourishing part, from the waste parts of food, in the terminal parts of the intestine (S Sh IV 16 17)

ANATOMY OF THE RECTUM

The last four and a half Angulas (अंगुल = 8 barleycorns = 2/3 in) of the large bowel is called the rectum Inside the rectum are three folds, at a distance of one and a half angulas from each other These folds are four angulas long and one angula high They are curved and are disposed one above the other like the spiral in a conch They are named from within outwards Pravahini (प्रवाहिणी - one which allows to flow), Wisarjani (विसर्जनि - one which casts forth), and Samvarani (सवरणि - one which brings together) In colour they look like the palate of an elephant The lowest fold is only one angula from the anus (गुदाद्वय - lips of the rectum-anus)

The anus is one and a half barleycorns away from the hair margin

The rectum is one of the ten soul spots
(प्राणस्थान) (W Sh III 13)

Attached to the large bowel is the rectum. It discharges wind and faeces. It is a vital spot, injury to it kills rapidly
(W Sh IV 10)

FUNDAMENTAL CAUSES OF PILES

अर्शस् (piles, polypus or warts) arise from disorders of " Wind ", " Bile ", " Phlegm " or " Blood " or from a combination of two or more of the above. They may be congenital.

PREDISPOSING CAUSES OF PILES

In those that have no control over themselves, particularly in those with a poor digestion, the humours are excited as a result of indiscretions, specially such as the following, eating forbidden (indigestible) food, eating again before the previous meal is digested, excessive intercourse with women, squatting, riding, restraining the desire to defecate or urinate.

Piles may result from abortion or miscarriage or from the pressure of an advancing pregnancy (W N VII 14)

Piles may result from straining at stools or during micturition (W N, VII, 12)

PATHOLOGY

The excited humours are diffused either singly or in couples or all together and, with or without " Blood " gain entrance to the main artery and proceed downwards. Having reached the rectum they pollute the rectal folds and give rise to fleshy sprouts.

These sprouts increase by contact with grass, wood, lumps of earth, stone, sand, cloth or cold water and become swellings. Such enlarged swellings are called piles.

Wagbhata says, " By these and other causes the Wind called Apana (अपान-Wind residing in the rectum) is excited, and causes the faeces to unite intimately with the folds in the rectum. As a result of this, moist nodules appear, these are called piles, " (W N VII 14 15)

EARLY SYMPTOMS

Piles give rise to the following early symptoms— Lack of appetite, difficult digestion, acidity, heartburn, constipation, flatulence, frequent eructations, rumbling in the bowels, thirst, fatigue of the lower limbs, loss of weight, swelling of the eyelids, a feeling as if the rectum is being sawed, cough, panting, loss of strength, giddiness, sleepiness or impotency.

They also give rise to a suspicion of severe anaemia, of consumption or of disease of the Grahani-dysentery (ग्रहणी— that part of the alimentary canal where the bile assists digestion and from which vital warmth is diffused)

When the piles are well-formed all these symptoms are intensified.

PILES ARISING FROM DISORDERS OF " WIND "

Piles due to " Wind " are very dry and are of various shades of red, with an irregular surface, they look like the flower of the Kadamba tree or like the stalk and bud of the wild cotton tree or like the eye of a needle.

Those affected by them are miserable with pain. The pain being felt in the rectum, lower back, side, umbilicus and penis.

Enlargement of the abdomen, swellings of the spleen and a swelling below the umbilicus (अर्शाल) may result therefrom.

The skin, nails, eyes, teeth, urine and faeces of such persons are dark in colour.

PILES ARISING FROM DISORDER OF "BILE"

Piles due to "Bile" are slender, spreading and yellowlooking, with bluish ends. They look like a piece of liver and are of the shape of a parrot's tongue. They are moist like the mouth of a leech. They are fusiform like a barleycorn. (यव)

Those affected by them pass bloody stools with much burning. Fever, burning sensation all over the body, thirst and fainting are their complications.

The skin, nails, eyes, teeth, face, urine and faeces of those affected by them are yellowish in colour.

PILES ARISING FROM DISORDER OF "PHLEGM"

Piles due to "Phlegm" are whitish, with a broad base, hard, fixed, sticky and pale.

They are shaped like the fruit of the Karir tree or like the stone of the jackfruit, or like the udder of a cow.

These piles do not break up easily nor do they ooze. There is much itching.

Those affected by them pass a not inconsiderable quantity of fluid, resembling the washings of meat, mixed with mucus.

Swelling, fever with rigors, loss of appetite, indigestion and heaviness of the head result therefrom.

The skin, nails, eyes, teeth, face, urine and faeces are pale in colour.

PILES ARISING FROM DISORDER OF "BLOOD"

Piles due to "Blood" disturbance look like the aerial roots of the Banyan tree or like coral and are the colour of Gunja (गुन्ज).

They produce the same symptoms as piles arising from "Bile."

If persons suffering from such piles get constipated, they suffer from intense pain accompanied by forcible ejection of a not inconsiderable quantity of blood. If this blood loss is repeated often, it leads to the special complications arising from serious loss of blood.

PILES DUE TO MORE THAN ONE HUMOUR

Piles due to a combination of disordered humours show mixed signs and symptoms. When piles show the signs and symptoms of two humours, we know that two disordered humours are the cause of the piles. There can be six such combinations of the three humours and "Blood."

CONGENITAL PILES

Congenital piles are the result of corrupted blood and semen of parents. It is necessary to recognise those that are so afflicted in order to treat them.

Such piles are difficult to see and when seen are found to be rough, pale, very painful and turned inwards.

Those suffering from them are thin and have a small appetite.

They have constant rumbling in their bowels with flatulence.

The veins of their limbs are always distended. They have thin semen and small families. Their voice is weak and they are easily angered. They have little vitality and are very lazy. They are very liable to diseases of the nose, head, eyes and ear, and have a feeling of distress in the heart.

COURSE

When all the three folds are affected by piles, the "Wind" called Apana is

obstructed by them This " Wind " then returning and rising up, joins with the " Wind ", Vyana and destroys the vitality of the person so affected

The wise man should have his piles treated as soon as possible. If they are not treated early they quickly obstruct the rectum and produce a disease called " Obstructed rectum and abdomen " (बद्धगुदोदरम्) (W N VIII 59) also (C Ch X 31)

All the above are the common symptoms and signs of piles and were described by the great sage Vyas A good physician should always note these first and then commence treatment

PROGNOSIS

Piles situated on the outer and middle folds should be undertaken (for treatment) Regarding those situated on the innermost fold, the wise physician should utter a warning (that they are not curable) and then treat them

The piles which are amenable to treatment are those that arise from the disorder of one or two humours and those that are situated upto the second fold Even those that result from disorders of all three humours are curable, provided they have few symptoms

Piles which have lasted for more than a year and those that are due to disorders of all the humours are difficult to cure The congenital variety the wise physician should shun (because it is so difficult to cure)

If a patient with piles suffers also from swelling of hands feet, face, umbilicus, anus and scrotum and also has pain in the region of the heart or chest, he should be considered incurable (C Ch IX 25)

Pain in the heart or chest, giddiness, vomiting pain all over the body, fever, thirst, suppuration in the rectum, kill a patient with disease of the rectum (C Ch IX 26)

Thirst, loss of appetite, much pain, severe loss of blood, swelling, diarrhoea or dysentery, if associated with piles lead to death (M Arsh 41)

TREATMENT

Piles can be treated in four ways -

By medicine, by caustic, by cautery, and by the knife

Piles which are of recent origin and are due to slight disorders of the humours, as also those with few symptoms or complications are suitable for treatment with medicine

Piles which are soft, broad, dark and raised are best treated by caustics

Those that are hard, fixed, large and rough are best dealt with by the cautery

Those that have slender root-like processes with much discharge and are raised are best cut out

Piles which are not visible (congenital piles) can be treated by medicine but for treatment by the other three methods, the piles must be visible and raised

तत्र बलवन्तमातुरमशौभिरुपद्रुतमुपस्तिग्ध परित्विज-
मनिलवेदनाभिवृद्धिप्रशमार्थं स्निग्धमुष्णमत्पमन्न द्रवप्राय
भुक्तवन्तमुपवेश्य सवृ (मृ) ते शुचौ देशे साधारणे व्यथे
काले समे फले शय्याया वा प्रत्यादित्यगुदमन्यस्योत्तङ्गे
निषण्णपूर्वकायमुत्तान किञ्चिदुन्नतकटिक वस्त्रकम्बलकोपविष्ट
यन्त्रणशाटकेन परिक्षिप्तग्रीवासकय परिकर्मिभि सुपरिगृही-
तमस्पन्दनशरीरं कृत्वा घृताभ्यक्त यन्त्रमृज्ज्वणुमुख पायौ
शनै शनै प्रवाहमाणस्य प्राणिधाय प्रविष्टे चाशौ वीक्ष्य
शलाकयोत्पीड्य पिचुवस्त्रयोरन्यतरेण प्रमृज्य श्वार पातयेत्,

पातयित्वा च पाणिना यन्त्रद्वारा पिधाय वाक्छतमात्रमुपेक्षेत, ततः प्रमृज्य क्षारबलं व्याधिवलं चावेक्ष्य पुनरालेपयेत्, अथार्शं पक्वजाम्बवप्रतीकाशमवसन्नमीषन्नतमभिसमीक्ष्योपावर्तयेत्, क्षारं प्रक्षालयेद्धान्याम्लेन दधिमस्तुशुक्लफलाम्लैर्वा, ततो यष्टी-मधुकमित्रेण सर्पिषा निर्वाप्य यन्त्रमपनीयौत्थाप्यातुरमुष्णोद-कोपविष्ट शीताभिरद्धि परिषिञ्चेत्, अशीताभिरित्येके, ततो निर्वातमागारं प्रवेद्याचारिकमादिशेत्, सावशेषं पुनर्द-हेत्, एव सप्तरात्रात् सप्तरात्रादिकैकमुपक्रमेत्, तत्र बहुषु पूर्वं दक्षिणं साधयेत्, दक्षिणाद्ग्रामं, वामात्पृष्ठजं, ततोऽग्रज-मिति सु चि ६ ॥४॥.

ly and with a continuous movement. The speculum having fully entered, the pile is looked for.

The pile is now lifted up by means of small rods (probes). It is next wiped by means of a cotton cloth or some similar material. The caustic is next dropped on it. The caustic is made in three strengths, and may be dropped by means of a small ladle, brush, probe or something similar.

Having dropped the caustic, the opening of the speculum should be closed by the hand, and one should wait for as long as it will take one to say a hundred words. After wiping the pile again one should see the effect of the caustic on it. If necessary one should apply the caustic again till the pile looks like the ripe fruit of the jambul tree (a rich purple) and slightly drooping. Having seen this, further application of the caustic should cease. The caustic is next washed away by means of acid derived from fermentation of corn, or the clear fluid obtained from curds or by the juice of sour fruits. Next a mixture of glycerrhiza, honey, and liquified ghee is applied to the pile and the speculum is withdrawn.

The patient is now helped to get up and is made to sit in hot water and his body is sprinkled with cold water. Some recommend sprinkling with lukewarm water. He is next taken to a house (room) free from draughts and is prescribed the rules for promotion of health (after treatment).

If a portion of the pile still remains it should be burnt again. One should treat one pile at a time, each at an interval of a week.

In most cases one treats the pile on the right side first, then the one on the left, next the one behind and finally the one in front.

The person suffering from piles who is to be treated by means of the caustic should be strong enough (i.e. he should not be very weak). He should have had preliminary treatment such as soothing oily applications to the piles and he should have been sweated in order to diminish the pain caused by "Wind". He should have been put on a light almost liquid diet consisting of hot greasy foods. Before the actual application of the caustic he should be asked to empty his bowels. He is then taken to a clean place. Then at a time when it is not too hot or too cold and when there is a cloudless sky, he should be made to lie down on either a level plank or on a bed, with his face upwards and with the upper part of his body across the thighs of another. The bed or the plank should be so placed that the anus is directed towards the sun. The hips should be slightly raised (by means of pillows or such means). The patient should be covered over by a small blanket and he should be encircled by the special restraining garment. The thighs are next comfortably brought and held close to the neck, by the attendants.

The body being rendered immovable by these means, the anus and the speculum are well smeared with solid ghee. The speculum is next directed straight towards the anus and is introduced into it very gradual-

Piles which are due to "Wind" or "Phlegm" should be treated either by caustic or cautery. Those that are due to "Bile" or "Blood" and are soft are best treated by caustic.

When the piles are properly burnt, the "Wind" can go in the proper direction and there is a return of appetite and improved digestion with a feeling of lightness. The strength and colour return and there is ease of mind.

If the piles are burnt too much, there is a burning sensation in the walls of the rectum, there are fever, thirst and fainting attacks. There may also be severe loss of blood and complications resulting therefrom.

Piles which are imperfectly burnt are dark in colour and have small ulcers. There is itching and difficulty about the Wind. There is discomfort in the limbs.

In patients of good vitality the piles should be first cut off and then cauterised.

TREATMENT OF PILES WITH COMPLICATIONS

If the piles are prolapsed they are necessarily due to disorders of all the humours and they should be treated by sweating, by anointing the whole body with oils, by baths, by bleeding and by application of ointments. They may also be treated by caustic, cautery or the knife. In such cases it is not necessary to use the speculum.

If the piles have just commenced to bleed they should be treated by remedies suitable for "Blood" and "Bile".

If the piles are accompanied by abnormal stools, treatment suitable for diarrhoea or dysentery should be prescribed.

If the piles are complicated by constipation, the patient should be asked to

drink oils or other treatment suitable for constipation should be prescribed.

Other complications should be dealt with as they arise.

AFTER TREATMENT

When the piles have been burnt they should be anointed. In order to arouse the appetite of the patient and to guard against further excitation of the "Wind", he should be treated by baths and also by giving ghees which have been specially prepared as stomachics and as carminatives. These should be combined, if necessary, with powders containing asafetida etc.

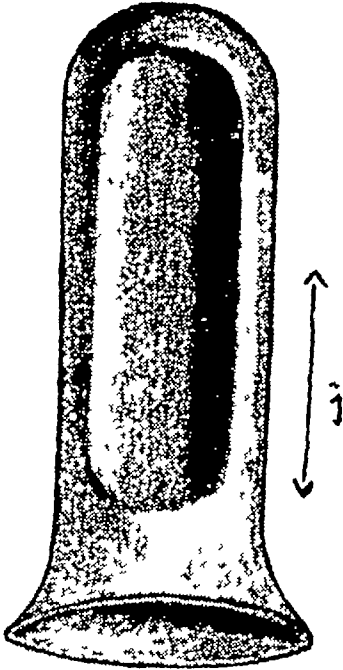
When piles are due to "Blood", "Bile" or "Phlegm" suitable medical treatment should be adopted in addition.

Regarding diet, in all cases the patient should eat food prepared from rice, barley, corn or wheat. The food should be well-moistened with liquefied ghee and may be taken mixed either with milk or with a soup prepared with Neem leaves or with पत्रपत्र. According to the causative humour the following vegetables should be allowed (Here follows a list of twelve vegetables which are mostly greens). Whatever is greasy and will at the same time help to arouse the appetite should be permitted. In fact anything which will not promote the growth of piles and which will lead to a free flow of urine and faeces may be allowed.

If anyone else (but a physician) having passed the speculum treats the disease (piles) with caustic, cautery or the knife, then there may be giddiness, impotency, swelling, much burning, delirium, fainting, distention of the abdomen, suppression of urine or faeces, diarrhoea or dysentery, or even death.

THE SPECULUM

The speculum may be made of iron, ivory, horn or wood. It should be of the shape of the udder of a cow. The length should be four angulas and the circumference should be five angulas when used for males and six angulas when used for females.



It should have two openings, one for seeing and the other for treatment. If there is only one opening for treatment, there is no temptation to do too much while using the caustic, cautery or the knife. The latter opening should be three angulas long and wide enough to admit the thumb. Of the remaining one angula in the length, half an angul remains level, the other half is raised and turned out like an ear.

The instrument called Shamī (शमी) is like the above but has no holes. It is used for pressing on the piles (W Su XXV 19).

The physician should provide himself with six narrow rods which have cotton wrapped round the ends. They are used for

wiping. For work in the rectum, he should have two rods, ten and twelve angulas long (W Su XXV 34).

There should be three rods for application of the caustic and three rods for use as cautery. They should have ends like the seeds of the jāmbul fruit and they should be of different lengths (W Su XXV 35).

Some say that it is best to cut away the piles with the knife, others say that burning by caustic is best, and still others that cautery is very good for the purpose. It is a well known fact that wise and observant workers practice all the three methods. But any deviation in the method (technique) is full of risk. Mistakes about the use of the caustic, cautery or knife lead to impotency, swelling of the rectum, difficulty in micturition and defecation, terrible pain, much bleeding, recurrence of piles, moistness of (discharge from) those that reform, prolapse of rectum or even rapid death (C Ch IX 32-35).

I shall therefore tell you of methods by which piles can be cured completely, and which are easy, unlikely to go wrong and are not painful (C Ch IX 36).

I have translated here only those portions which I thought were important from the surgical point of view. The various applications for piles and internal medicines I have left out.

It will be seen that so far as the embryology of the rectum is concerned, the ideas are very vague indeed, in fact one can say that it is mere guesswork and imagination.

Regarding the anatomy of the rectum, it can be seen that they knew that there was a small and a large bowel. The three folds are obviously Houston's valves. The statement that the first fold occurs within

one angula of the anus does not correspond with facts if we take the folds to mean Houston's valves. At the same time one must remember that piles, as we know them, do occur within that distance of the anus in the columns of Morgagni, but these folds are longitudinal and not transverse like the folds described in Sushruta. The actual description of the folds is not at all bad and the names given to them are pleasing.

The fundamental causes of piles are in tune with the theory of the three humours - a theory which was accepted even in the West not very much more than a hundred years ago.

One cannot say much regarding the predisposing causes. The connection between heart and liver diseases is not at all touched upon, even though under prognosis a verse is quoted (C Ch IX 25) which says that a person afflicted with " piles " and generalised swelling is incurable.

The pathology is, as is to be expected, in accordance with the humoral theory. Even here Sushruta and Wagbhatta do not agree. The former maintains that a diffusion of the diseased humours occurs first, and then they descend along the main artery to the rectum where they produce sprouts. The latter considers that the action is local only, the " Wind " Apana making the feces unite with the folds and causing the formation of small nodules, which are piles.

Regarding the various materials from grass to cold water, which according to Sushruta cause the sprouts to develop into piles -

If Sushruta were writing today he would have added " Bromo " and similar papers. It is evident that this list refers to materials that are used in various parts of the country to wipe or clean the anus after defecation.

I remember a case, when I was in Bikaner years ago, where a patient who had been operated on for piles, got out into the hospital compound, defecated to his heart's content and then wiped himself with earth as was his wont. Unfortunately he developed tetanus later and died.

One has not much to say regarding the early symptoms of " piles " that are described, excepting to note that Sushruta describes " A sawing pain in the rectum ". Piles as such are not noted for the pain they cause, except when they are strangulated or inflamed.

In glancing through the books I have mentioned, I have seen that the only diseases of the rectum that are discussed are " piles " and fistula. I have seen no separate mention of diseases like fissure, ulcer, polyp, stricture, papilloma or cancer. They are all lumped together under piles. One however gets a fleeting glimpse of these as one reads the descriptions. The appearances of the " piles " described under the separate headings of humours and the symptoms attributed thereto do not however always correspond with the picture of our fleeting glimpse. I shall try and make myself more clear.

Under " Piles " due to " Wind " we read that they " look like the stalk and bud of the wild cotton tree ". This is a description appropriate for a pedunculated polypus. The next description under the same head is like the eye of a needle. Here the original word is सूचिमुख which I have translated as above. If the point of the needle were intended the word used would have been सूचिअग्र. At first I thought that the eye of the needle referred to mouths of the mucous glands on the surface of the pile but that would not be a description of the whole pile but only of a part. The very next sentence, where reference is made to the severe pain

felt, made me think of a fissure. A fissure-in-ano seen from below looks very much like the eye of a needle and we know that in fissure there is as much pain as is described there. It need not be said that this pain cannot accompany the polypus or the Kadamba flower like "pile". This is what I meant by saying that the symptoms attributed thereto do not however always correspond with the picture of our fleeting glimpse. The further description of enlargement of the abdomen and spleen, may correspond with condition of cirrhosis. The swelling below the umbilicus, अष्टीला, probably refers to a distended bladder caused by reflex retention. One must here note the methodical clinical observations made regarding the condition of the skin, nails, eyes, teeth, face, urine and feces in the descriptions of piles due to the three humours.

The description of "Piles due to Phlegm" corresponds closely to that of thrombosed or inflamed piles. There is some suggestion of pyelephlebitis in the fever with rigors mentioned in the symptoms.

"Piles due to Bile" remind one more of proctitis and ulceration than piles. It is to be noted they pass bloody stools with much burning. They also have fever.

"Piles due to Blood" make one think of papilloma more than anything else, particularly the villous variety, because they are like the aerial roots of the banyan tree or like coral. They have symptoms similar to "piles" due to "Bile" i.e. they pass bloody stools with much burning. If only the description of symptoms under "Phlegm" तैरुद्रुत सन्निष्माणमनल्प मासधावनसकाशमतिसार्यते " (Those afflicted pass a not inconsiderable quantity of a liquid resembling the washings of meat mixed with mucus) had been under "Blood" the picture would have been complete.

"Piles" which are due to disorders of more than one humour show the appearances and symptoms of the humour involved. Here it is possible to build up many composite pictures which are made to include cancer, ulcerations, papillomata, stricture etc.

The 'Congenital pile' does not appear to be a pile at all. First of all it is difficult to see. When seen it is अन्तर्मुख i.e. turned inwards. No description regarding discharges from it is given. The patient is liable to a host of other diseases. It appears to be more a condition of diathesis than of disease. Nyayachandrika (न्यायचन्द्रिका), which is a commentary, quoting Charaka, suggests that it is intended to convey that such people are the children of diabetics or consumptives.

In the next para all the three folds are said to be affected by piles. Knowing as we do what structures participate in the formation of piles, it is difficult for us to imagine such a condition. It is obvious that these cannot be piles. "The Wind" Apana obstructed by them returns and joining with the "Wind" Vyana (A wind which is distributed all over the body) causes the lowering of the vitality of the person. One can here think of cancer or of ulceration because of the extent of the lesions described. Both these can give rise to strictures which can obstruct the "Wind" Apana.

In the very next paragraph there is a quotation from Charaka where he says that unless the piles are treated early they lead to "obstructed rectum and abdomen" (बद्धगुदोदरम्). Ordinary piles may lead to a certain amount of obstruction, particularly when they are large or prolapsed, but never to the extent to deserve the fearful name of बद्धगुदोदरम्. Charaka must have come across some cases of stricture.

The prognosis is pretty guarded. The only forms of piles which can be cured are those on the outer two folds (readily accessible). Those due to disorders of one or two humours or even those due to three humours provided they had mild symptoms; also those piles which were not over a year old.

All other forms the physician is cautioned against.

Regarding treatment as practiced in those days, if we substitute injection for caustic, we have the same then and now so far as names go.

Regarding treatment by the knife it is mentioned that only in people who are (प्राणवत्) i.e. full of vitality, they should be cut off and then cauterised. The cauterisation was evidently with the idea of hemostasis. When it is remembered that no form of anaesthesia however crude is mentioned and that the hemostasis evidently depended entirely on the cautery applied through the speculum, one can easily understand why the patient should be full of vitality and why one of the premier qualifications of the surgeon must be शैर्ष्य (Courage), and also why the patient must be rendered immovable. It must indeed have been a trying experience for all concerned.

The cautery was the ordinary iron, the head being the size of the seed of the jambul fruit. This evidently was used through the speculum. There are no instructions given as to the degree of heat to be used, such as red-hot, white-hot etc. This method was in use in the West for quite a long time and it is within my memory that an actual cautery was used with a Smith's clamp. This clamp is illustrated in Down Bros 1936 catalogue. This does not mean that the actual cautery is used freely today. A modification however is still in use, and

when I was a house surgeon at St Marks, Sir Charles Gordon-Watson regularly used his own special clamp and Paquelin cautery. Today there are men who advocate the use of the diathermy current for destroying piles. In all these methods the underlying principle is the application of heat to destroy the tissue. With the newer methods the regulation of the heat is much more under our control.

The application of the caustic appears to have been the favourite method. The caustic used was a strong alkali prepared from the ashes of the bark of certain trees and also from certain shrubs. This was mixed with water and with quick or slaked lime, and then boiled down. After application and when its desired effect was produced, it was neutralised by some domestic acid such as acetic acid derived from fermentation of corn, or lactic acid contained in the clear fluid obtained from curds or citric or tartaric acids obtained from sour fruits.

In the detailed procedure, the one for the application of the caustic being given as an example preliminary treatment is carried out and the bowel emptied. The sun was used as an illuminant, in the absence of a powerful artificial source of light like electricity. Particular emphasis is therefore laid on a cloudless sky and the relation of the anus to the sun. The position of the patient is what we would call a slightly exaggerated lithotomy position. Though not so modest as the genu-pectoral or Sims' position it is probably selected because it gave a greater control over the patient. The directions for the introduction of the speculum cannot be improved upon today, calling as they do for a slow and continuous movement. The lubricant can certainly be improved upon, but one must note that solid ghee (घृत) and not liquified ghee (सर्पिस्) is used. After the pile is seen it is lifted up by probes, the object evidently is to lift it well into the spe-

culum so as to render it more visible and at the same time by completely filling the lateral opening in the speculum to confine the action of the caustic to the pile only. It is to be further noted that no rule of thumb is given for the application of the caustic but one is told to look for certain changes in the pile and then cease further application. During the action of the caustic the opening of the speculum is covered over by the hand, most probably the object is to prevent the speculum being ejected, as this would indeed be a calamity while the caustic was there unneutralised. When the action is complete the caustic is neutralised and the speculum is withdrawn after application of soothing preparations to the piles. The patient is given a hot sitz bath in order to relieve the pain of the application. Sushruta insists on treating one pile at a time and that too at an interval of a week. If only this very sound advice had been followed by those who follow his methods today, there would be fewer strictures and much less agony and suffering as a result of the application of strong alkalis to the whole of the anal canal in the misguided effort to cure piles quickly. Finally he tells you which pile to start with and which to end with, this is again sound commonsense, as the easier ones are dealt with first, having in view the lithotomy position.

I have nothing but sincere and great admiration for this verse of Sushruta. It shows a man well versed in and knowing every detail of what he is telling you. I have therefore given it in the original.

The speculum appears familiar to us and therefore must have been copied and later improved upon by the Westerners. Curiously enough Sushruta's speculum is made larger for women. The one lateral opening Sushruta tells you is there to prevent your enthusiasm getting the better of your judgement (एकद्वारे हि शस्त्रक्षाराग्नीनामतिक्रमो न भवति)

Even though solid instruments (शमियत्र) are used for the treatment of strictures yet they are not used for the treatment of piles by the faculty today. The idea of continuous pressure for the treatment of piles still persists in the minds of the laity however and one comes across advertisements in the monthly and other magazines for shaped plugs used in the treatment of haemorrhoids.

In the medicinal treatment, treatment by a buttermilk diet and by the ingestion of marking nuts are prominent. In fact the marking nut is called by the name of अशोत्र meaning the destroyer of piles. The applications for piles are legion and it will indeed take a long time to try them all out thoroughly. Some of them are quaint in that they contain substances like the droppings of fowls etc.

When one comes to review the whole subject one can see that the anatomy and pathology of the rectum today are far in advance and on a more accurate basis than they were at that time. The observation of clinical signs and symptoms made by the ancients was quite good but because of the lack of proper appreciation and knowledge of pathology the grouping was incorrect.

Turning to the surgical aspect, the ancients induced thrombosis and fibrosis by application of strong alkalies. Today we induce an inflammatory reaction and fibrosis, and often thrombosis by injections of irritating materials into the substance of the piles. Even here, not so many years ago stronger solutions were used and we used to have trouble in the shape of sloughing of the piles, with consequent ulceration, secondary haemorrhage and suffering. All these are described quite well by Sushruta as consequences of over application of caustics to piles. We have certainly benefited by our experience and we use milder injections with consequent diminution of the risks.

The cautery is definitely out of favour with the majority of surgeons today though even here progress had been made in the method of application of the cautery by the use of a clamp in conjunction with the cautery. The advantage of the clamp and cautery was rapid healing but the great risk was the recurrent haemorrhage. It has justly been pushed in the background.

Our greatest advance has been in the treatment by cutting and of these the ligature has been the simplest. Compared with first cutting away and then cauterisation through a speculum, it is infinitely safer and simpler. Above all the progress has been rendered easier by anaesthesia, but the ligature operation was invented long before anaesthesia was in use. In fact, the founder of the St Mark's Hospital, London, Frederick Salmon first started the hospital more than a hundred years ago for the treatment of piles by the ligature operation. There are numerous modifications of the ligature operation but in all, the bleeding is controlled by either ligature or suture. Further safety and comfort have been assured by Listerian principles.

Let me now review why I think the Surgery of the rectum of Ayurveda was stunted and why in fact it retrogressed.

Sushruta realises the dangers attendant on the treatment by caustics, cautery and knife and he warns against anyone but a physician carrying out the treatment.

Charak however is not so moderate. After using much the same words as Sushruta, he goes on to say —

यत्तु कर्म सुखोपायमल्पभ्रशमदारुणम् ।

तदर्शसा प्रवक्ष्यामि समूलाना निवृत्तये ॥ ३६ ॥

‘ I shall now describe methods, by which piles can be cured completely, which are

easy, unlikely to go wrong and are not painful ” (C Ch IX 36)

Coming from such a well known physician as Charaka, particularly one who was considered an authority on therapeutics, these words must have turned away many an inquiring mind from all treatment except local applications and internal medication. Charaka keeps his promise so far as methods of application and internal treatment are concerned as he writes more than two hundred verses for such treatment of piles. The very number of these prove that there was no really effective method of medication or application. I feel that he has done a great harm to the cause of Ayurvedic rectal surgery. Depending on the word of the great Charaka men turned away from the surgical aspect as dangerous and followed the path of least resistance. If only Charaka had not added the thirtysixth verse and had but stopped at the thirtyfifth and then continued on with his two hundred verses on internal medication, we might have had further progress in rectal surgery—WHO CAN TELL ?

C—Charaka M—Madhavanidan S—Sushruta,
W—Wagbhata Arsh—Arshonidana, N—Nidanasthana,
Sh—Shareerasthana, Su—Sutrasthana
Ch—Chikitsasthana

References are written with the name of the author first, then the name of the part of the book, followed by the chapter in Roman numerals and finally the number of the verse.

Arshonidana—Chapter dealing with signs symptoms etc of piles

Nidanasthana—Part dealing with signs and symptoms

Shareerasthana—Part dealing with embryology, anatomy and physiology

Sutrasthana—General introduction

Chikitsasthana—Part dealing with treatment

तच्च शस्त्रकर्माष्टविधं; तद्यथा—छेद्यं, भेद्यं, लेख्यं, वेध्यम् ॥
एष्यम्, आहार्यं, विस्राव्यं, सीव्यमिति ॥ ५ ॥

आयतश्च विशालश्च सुविभक्तो निराश्रयः ॥

प्राप्तकालकृतश्चापि व्रणः कर्मणि शस्यते ॥९॥

—सुश्रुत व्याख्यायां सूत्रस्थाने पञ्चमोऽध्यायः ॥

Surgical procedures are of eight kinds, they are as follows—
Cutting, breaking, scraping, perforating, probing, excising,
draining and sewing.

Long, wide, clean cut, made at the proper time, avoiding
important structures are the characteristics of a good incision.

—Sushruta, Sutrasthana, fifth chapter,
fifth & ninth verses.

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[No. 1

EDITORIAL

We have pleasure in submitting to you our first issue of the second year

Accompanying this number is the report of the proceedings of the meeting of the governing body and of the general body of the association at Madras. A complete list of the members is also attached, so that members will know, which of those who should be members of the association in their respective neighbourhood, are or are not members. We feel sure that members will try and persuade non-members to become members. Many do not know of the existence of the association—such should be informed. Others are luke-warm and these should be warmed up.

Those members who were present at the Madras meeting will require no further stimulus. The Madras meeting was a great success. We feel sure that every member present there feels that he was a wiser and a gladder person after the meeting. We are not afraid to leave to the judgement of others whether such meetings as those at Madras are worth while or not, because we are certain that there can never be two opinions regarding the utility of such meetings. Take only one example that of "Peptic ulcers". We were able to hear the opinions of men who have a vast experience in this field. Quite apart from the academic interest we came in living contact with men from all over India. We were able to hear them express their opinions and that is something no article in any journal can ever equal.

Our hosts in Madras were falling over each other to entertain us. We must (and here we must be provincial and speak as from Bombay) say that Madras hospitals were an eye-opener to us. The work done there is of the first order and their X-ray equipment can only be equalled and rarely exceeded by even the rich hospitals of Europe and America. We can truthfully say that the hopes of the President, Col Pandalarai that "This meeting will be looked back at as a memorable one" were entirely fulfilled.

Amongst other things the president expressed a hope that the association would mature into a body similar to the Royal College of Surgeons of England and that at some future date it would become an examining body as well. We do hope that the last part of his hopes will be postponed for many a long year to come. Our association is an association for the promotion of good surgery in India. Let us concentrate on that. We should like to see it as a pure scientific body engaged in the uplift of Surgery in India. Once examinations are introduced there will be introduced all the evils and petty jealousies that are inseparable from examinations and examiner-ships, perhaps not so much from the financial point of view, as from the prestige point of view. We have started with a good thing this year. We have established a central office. Let us develop this further. Let us have a central museum or better still a central Library from where

those who need can obtain references in connection with their work such as are obtained from the Royal Society of Medicine in London. We feel sure this handicap is felt by many and such a developement will meet a general want. Regarding the examinership many of our members are examiners for the highest degrees in Surgery granted by our universities. Let them set up a standard there as high as they wish, but before they do that let them improve the post-graduate teaching, because most of the examiners are teachers themselves. It would not be fair to set a

high standard for an examination unless the candidates are trained up to that standard

The scientific meetings occupied to the full the three days allotted to the session. In fact the discussion of the four subjects could just be completed in the allotted time. It was therefore resolved at the meeting of the general body that only three subjects should be discussed at each session.

The redistribution of the subjects for discussion at following sessions is now as follows

Easter 1941 (at Delhi)

Treatment of acute appendicitis
Injuries of the elbow joint
Treatment of empyema thoracis

Mr V L Parmar, Bombay
Mr M G Kini, Vizagapatam
Mr M M Pandya, Bombay

1942

Surgery of the knee joint
Surgical aspects of filariasis
Surgical treatment of pulmonary tuberculosis

Mr M C Condillac, Trichinopoly
Mr U P Sinha Patna.
Mr V R Sanzgiri Bombay

1943

Laryngeal carcinoma
Injuries of the thorax
Surgery of injuries of the head

{ Mr S J Gandhi, Bombay
{ Mr S G Joshi, Bombay.
Mr C S. Patel, Bombay
Mr R N Cooper, Bombay

The general body decided that in order to encourage the spirit of research in the younger generation an annual prize to the value of Rs. 100/- be awarded for the best work done and results submitted on some simple practical investigation, to be selected each year by the governing body. The subject for this year is 'Blood changes in surgical inflammation'. Any particular aspect of the blood change can be selected or emphasised by the investigator but the conclusions must be supported by actual

work done by the investigator and must not be a mere compilation. The investigator must be a medical graduate of not more than 10 years standing.

This number of the journal contains two of the subjects discussed at the Madras session. Col Spackman, Prof of gynecology and midwifery at the Grant Medical College, Bombay, has kindly responded and has given us a detailed paper on Cotte's operation. We are very much obliged to him for his kindness.

PEPTIC ULCERS

By Mr C P Viswanatha Menon, M, S, F R C S

(Hon Surgeon, General Hospital, Madras)

I am introducing this rather hackneyed subject for discussion before you to-day because of its great importance to this part of India. My observations are based on a personal experience of 1410 cases during the years 1926 to 1935. The series also includes 50 cases under the care of Colonel Pandalai during the time I was his assistant. 826 cases were studied in detail with regard to the notes available in the records. Of these latter 372 were operated on by myself. The age, sex, incidence and geographical distribution have been worked out of the whole total, while the pathological findings, symptomatology and the results of treatment have been discussed with regard to only 826 cases.

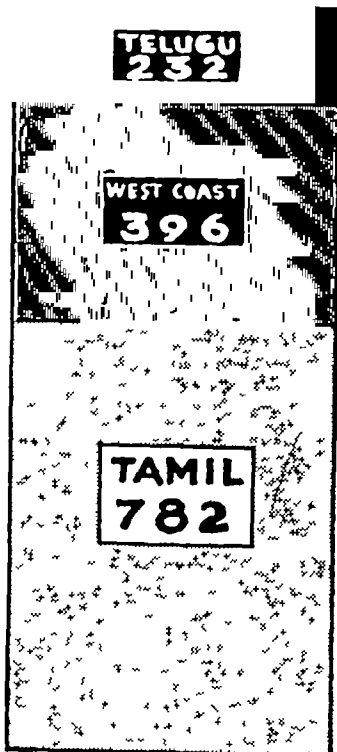
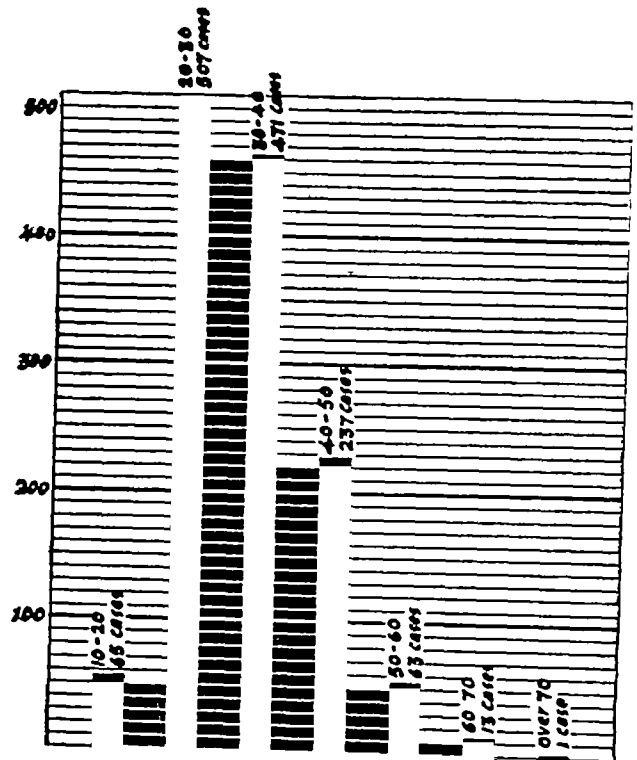


Chart I

✓ AETIOLOGY—Ulcers of the stomach and the duodenum are most common in the poor working classes though no profession

or society is free from its victims. Chart 1 shows the distribution according to linguistic areas. The majority of our cases are from the Tamil districts and that is because of the situation of Madras. The West Coast comes second and the Telugu districts third.

Chart II



Youngest - 11 years

Oldest - 76 years

✓ Chart 2 shows the age incidence. The youngest in the series was a boy of 11, and the oldest was 76 years of age. The preponderance of cases belonging to the third, fourth and fifth decades of life shows that this disease affects man during the most active period of his life, diminishes his wage earning capacity and is a great economic loss to the country. It affects males chiefly. Out of this series of 1410 cases only 51 were in females showing a proportion of 26 males to every female.

The question as to why this disease is so common in this part of India while it is so very rare in the north is no more easy to answer than the other bigger question as to why it should occur at all. I do not propose to waste your time going into the various theories that have been put forward at different times by different people all over the world. They are well known. The nutrogenic theory which is gaining favour in America and which attempts to attribute the increasing incidence to the onward march of civilization could hardly be applied to the majority of our patients here. They are neither "highly strung" nor are they so very "civilised". The problem with them is mainly their poverty, and their conditions of life, badly cooked food, long periods during which the stomach is left empty and over-feeding when the opportunity occurs are all probable factors. The food probably is deficient in essential vitamins. McCarrison experimenting with rats came to the conclusion that the South Indian diet was deficient in vitamins and that such a diet predisposed to peptic ulcers. Somervell with his large experience in Travancore says that the disease is most common in people whose staple food is tapioca and rice, which are deficient in vitamin A. The dietetic factor seems to be of some importance but is probably only one of the many exciting causes. It is more likely that in a universal disease like this some common factor (which we now call constitutional predisposition and tissue susceptibility) is operating which is awaiting discovery before the whole problem is elucidated.

PATHOLOGY - Certain facts regarding the pathology emerge from a study of the operative findings. By far the commonest site of the ulcer is the first part of the duodenum about $3/4$ " to 1" beyond the pyloric vein. The operation notes in 120 cases out of 826 describe the ulcer as anterior and in another 108 as posterior.

In a few cases the ulcer was at the junction of the first and second parts of the duodenum. In two cases only it was in the second part and recently I had one case in which it was in the third part, just proximal to the superior mesenteric vessels. In all the other cases the notes say "cicatrised indurated ulcer, first part of the duodenum". When felt at operation these lesions feel like lumps often the size of a lime or even bigger. The ulcers are in these cases on the posterior wall of the duodenum, with anterior extension of the cicatrisation. Multiple ulcers have also been seen occasionally. Duodenal stenosis and dilatation of the stomach are present in a large proportion of the cases.

Fig 1



Photograph of specimen showing multiple gastric ulcers in the area covered by the dotted line. The lesser curve is seen from within. The probe passed through the duodenum and a chronic duodenal ulcer is seen near it.

(Photograph by the Barnard Institute of Radiology)

Gastric ulcers are almost always limited to the lesser curvature near the cardiac orifice and on the posterior wall. A few nonmalignant ulcers have been seen on the pyloric portion, these are, however, rare and one should always keep the possibility of carcinoma in mind. There were 77 cases out of 826 (9.08%) in which the ulcer was in the stomach. In 79 cases (9.56%) there were gastric and duodenal ulcers, 18.6% of the cases, therefore, had an ulcer in the stomach. With regard to gastric and duodenal ulcer occurring together, there is reason to believe that the duodenal lesion precedes the gastric. The duodenal ulcer is often seen to have healed with stenosis while the gastric ones are still active. Sometimes small early gastric ulcers are seen with chronic duodenal lesions. I have recently had two cases where gastro-duodenectomy was done for duodenal ulcer and the portions of stomachs removed showed in one case a small unsuspected ulcer on the lesser curve and in the other multiple superficial ulcers in the lesser curve. See Fig 1.

Certain associated pathological conditions have been seen. Of these the commonest is early cirrhotic changes in the liver—40 cases. In some cases this is more advanced and has occasionally been the cause of mortality.

Enlarged mesenteric glands occur in association with duodenal ulcers and sometimes independently and then they cause symptoms like those of ulcer. Pathological examination of such glands has yielded negative results. Beyond a certain amount of eosinophilia and some dilatation of the lymph spaces nothing characteristic is seen. They are neither tuberculous nor lymphadenomatous.

Tuberculous ulceration of the jejunum and ileum is another associated condition. In a few cases it has been mistaken for peptic ulcer clinically.

Chronic cholecystitis is sometimes seen. In four cases gall stones were present and cholecystectomy was done in addition to gastro-jejunostomy. Chronic appendicitis is often seen and the appendix is always removed.

Localised chronic pancreatitis is always present where an ulcer has penetrated into it, but sometimes the whole pancreas feels indurated.

SYMPTOMATOLOGY — Pain, variable in character and in its relation to meals has been the most constant symptom. In most of the cases the story is that there is constant pain in the epigastrium increased by food and relieved by vomiting. For this latter reason it is often self-induced. More than three fourths of the cases in this series had vomiting, induced or spontaneous.

Pain radiating to the back almost always indicated a posterior ulcer adherent to the pancreas.

In a few cases pain is relieved by food or soda-bicarb and patients often come to the out-patients carrying a packet of the latter. Acid eructations are present in many cases.

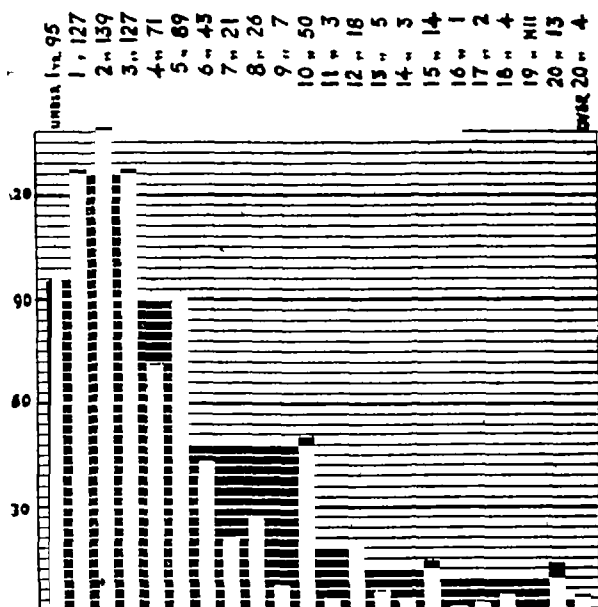
Lumps moving about in the abdomen are often complained of.

Haematemesis of a mild type was complained of in 27 cases. These have mostly been in cases of duodenal ulcer with stenosis and is probably due to secondary acute ulcers. Melena was present in only 8 cases.

The appetite is good but they are afraid to eat as they know the consequences only too well. Loss of weight and a variable degree of secondary anaemia occur in the late cases.

Chart 3 shows the duration of symptoms. The large number of cases with symptoms of less than 1 year's duration does not indicate the number of early cases operated on. These are mostly cases in which evidence of obstruction are found and confirmed later at operation and the history as given by the patient dates only from the time the pain has become continuous and has lost the periodicity and remissions characteristic of the early stages of the disease. The same remarks apply to the next three columns also. The longest duration has been 40 years in a man of 60. From a consideration of the age and the duration of symptoms in individual cases, the average age of onset appears to be round about 20.

Chart III



Longest duration 40 years

Of physical signs there are very few, tenderness and rigidity of the upper part of the right rectus is present when the ulcer is still active. Visible gastric peristalsis could be demonstrated in a tenth of the cases. Otherwise physical examination is negative.

DIAGNOSIS has been easy in the majority of cases and the history among all other things is the most important. Induced vomiting and visible peristalsis are diagnostic of a stenosing ulcer. Barium meal examination and fractional test meals have not been used as a routine and have been reserved for early or doubtful cases. In the ordinary case with stenosis they are unnecessary. Hospital patients do not stay long enough to undergo these investigations which necessarily involve waiting for some time before they are completed. They come to hospital having made up their minds to undergo an operation and if this is not done within two or three days they run away. I have lately made it a practice to screen the cases and by this means one can get all the information one needs. Films are only taken when there is something to record.

I shall not go into a discussion of all the conditions which may be and have been mistaken for duodenal or gastric ulcer. The very few cases where mistake have been made were in early cirrhosis of the liver, tuberculous ulceration of the jejunum and mesenteric lymphadenitis. These conditions are often revealed only at operation.

TREATMENT -- The question of medical treatment does not arise in the majority of this group of cases. Operative treatment is indicated in these cases for the following reasons --

1, They are mostly associated with stenosis and dilatation of the stomach and the problem is mainly a mechanical one,

2, Ulcers which have eroded all the coats of the stomach and have become adherent to neighbouring organs, have reached the irreversible stage (the majority of them are of this type), healing under medical treatment is unlikely and if it does occur, the thin layer of epithelium which

covers the ulcer is liable to break down at the slightest provocation,

✓3 There is the ever present danger of haemorrhage and perforation and this is an important consideration in a country where medical and particularly surgical aid is not available easily

✓4 The economic condition of 99% of these cases does not permit of prolonged medical treatment. Even those who can afford it find the regime too strict and difficult to follow. Further, patients under medical treatment have to exist as chronic invalids and are never free from the fear of the ulcer breaking out again

5 The possibility of a gastric ulcer being carcinomatous or of a carcinoma subsequently developing in one is a strong argument for radical treatment when one considers the prognosis of gastric carcinoma

One would of course treat medically an early ulcer in a patient who can afford the time and expense involved. But in the hospital class of patients in this country, surgical treatment is the treatment of choice

For stenosing duodenal ulcer, simple posterior gastro-jejunostomy gives excellent results. Gastro-jejunal ulceration, the one dreaded sequel of this operation is rare in this type of cases. It is commonest in the non stenosing ulcer with high acidity. It is this latter type of case that sets the greatest problem to the gastric surgeon. Partial gastro-duodenectomy has been done in a few cases but has a high mortality in the type of patients seen here

Physiological resection where the ulcer is left behind and a good portion of the stomach is removed has been done in a few cases. The difficulty here is mainly one of technique and connected with the closure of the pyloric stump. The muscular coat

here is very thick and friable and satisfactory invagination of the suture line is difficult as the stomach rapidly narrows towards the pylorus in this situation. Again one might with justification question the rationale of this resection. The acid secreting fundus is left behind and there is no proof for the view that the stimulus for gastric secretion is situated in the pyloric portion. The 'ulcer bearing' area is removed, however and that is something to be said in its favour

For gastric ulcers, the treatment of choice is partial gastrectomy including the pylorus and practically the whole of the lesser curvature and a good portion of the greater curvature. Gastro-jejunostomy alone does not relieve the symptoms completely and the fear of severe haemorrhage or a carcinomatous change is always there. Where, however, the general condition of the patient is poor or where the extent and situation of the ulcer presents insuperable technical difficulties, only gastro jejunostomy is done.

For gastric ulcer occurring with duodenal ulcer, a partial gastrectomy leaving the pylorus and duodenum behind has been done wherever possible

GASTRO-JEJUNOSTOMY The usual operation is a posterior no-loop retrocolic anastomosis with a vertical curvature to curvature stoma. No clamps are used. Occasionally the meso-colon is very short and does not permit of an opening sufficient to bring up the stomach into the greater sac being made. In such cases an opening is made in the gastro colic omentum and the jejunum is brought up in front of the colon leaving a fairly long loop. No vicious circle vomiting has followed this procedure though this has been done in 19 cases

Again, in a patient who is not very well relaxed under anaesthesia or when the ope-

ration is done under local anaesthesia, the colon instead of being turned up is left alone, the lesser sac is entered through an opening in the gastro-colic omentum, the jejunum is brought up through a hole in the meso-colon and the operation done through the lesser sac. The opening in the gastro-colic omentum is later stitched up.

PARTIAL GASTRECTOMY—Except when there is a duodenal ulcer also, the duodenum is divided just beyond the pylorus and about 2/3rds of the stomach is removed. The anastomosis is made with the jejunum brought up in front of the colon to the whole cut end of the stomach. A fairly long loop is left and the lesser curvature is attached to the proximal part of the jejunum.

Fig 2



Skiagram taken soon after Barium meal. Partial gastrectomy 8 months ago. Shows good emptying of stomach and no regurgitation into proximal loop (Skiagram taken by Dr P Rama Rau)

This is a radiogram taken nine months after an operation of this type done for a

gastric ulcer and shows very satisfactory emptying with no regurgitation into the proximal loop.

Fig 3 is the skiagram of the case from which the specimen shown in Fig 1 was removed. The skiagram was taken 2 weeks after operation and shows some spasm near the outlet, but satisfactory emptying.

When the ulcer is large and penetrates into the pancreas the base of the ulcer is left behind, the stomach wall being cut all round the penetrating portion. The opening thus made is immediately closed with a running suture to prevent escape of gastric contents. The base of the ulcer is treated with the actual cautery or with pure carbolic and covered over by a bit of omentum.

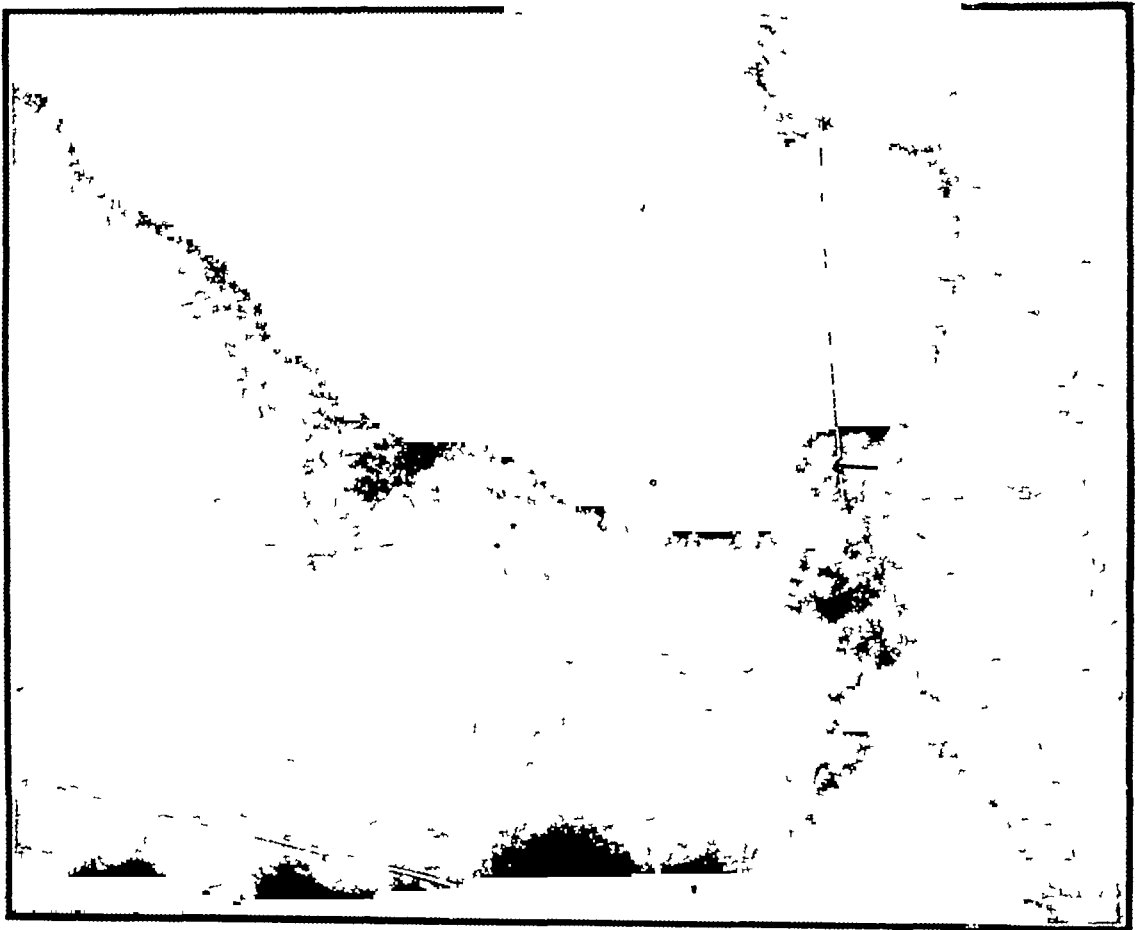
Occasionally the ulcer is very high up in the lesser curvature and it is found difficult to get the clamps beyond the ulcer. In such cases, the stomach wall is cut beyond the ulcer after ligaturing the coronary artery and a through and through continuous stitch is started and follows each cut in the stomach wall. Thus by cutting and stitching the stomach is mobilised sufficiently for comfortable application of clamps. The suture line is reinforced by a Lembert suture, clamps are applied and the operation completed in the usual way.

✓ **RESULTS**—The immediate mortality in gastro-jejunostomy is very low. In my own cases 11 out of 353 cases died giving a mortality of 3.2%. This is rather high and includes earlier cases done before spinal anaesthesia was extensively used. At present the mortality is almost nil and it is very unusual indeed to lose a case of simple gastro-jejunostomy. Partial gastrectomy, however, has still a considerable mortality. 6 out of my 19 cases died, a mortality of just under 1/3rd. But the series is small. One death was due to anaesthesia, the spinal

having to be supplemented by CE mixture In another case there was milary tuberculosis of the peritoneum and the gastrectomy was perhaps ill-advised The other deaths have all been in cases of gastric with duodenal ulcers where the operation has been difficult Of late I have found that infiltration of the splanchnic area with $\frac{1}{2}\%$ novocaine by Braun's method reduces shock considerably

The number of cases admitted as gastro-jejunal ulcers are very few indeed, considering that on an average over 300 cases are operated on annually in the General Hospital It is possible that our failures go to some one else just as we get cases operated on by others The greatest compliment to operative treatment is that many people come and ask to be operated upon having seen their friends

Fig 3



Skiagram soon after Barium Meal Partial gastrectomy two weeks before Good emptying and no regurgitation into proximal loop The notch indicated by the arrow is due to peristalsis with an element of spasm, the anastomosis being recent.
(Skiagram by the Barnard Institute of Radiology)

✓ When we come to consider late results we are entering into the region of conjecture Follow-up methods have failed and are almost impossible in this country One can only assess the results indirectly

cured by operation Not every case that is admitted for a recurrence of symptoms has an anastomotic ulcer In a few cases I have found the symptoms to be due to achlorhydria and hydrochloric acid has relieved them

The treatment of gastro-jejunal ulceration is by radical excision. The operation has a mortality but slightly higher than that of partial gastrectomy. Four cases of excision done by Colonel Pandalarai during the last 5 years were traced and all four lived. Two cases were treated by exclusion of the anastomosis by dividing the stomach proximal to it, closing off the distal end and making a Polya type of anastomosis with the proximal end and a loop of jejunum lower down. Both died, one six months later from perforation of an ulcer at the new anasto-

mosis and the other, a case of gastro jejunal ulcer after partial gastrectomy done elsewhere from an unknown cause one month after operation.

I am indebted to Lt Col K G Pandalarai I. M. S. for permission to use his cases. My thanks are also due to the Superintendent, Govt General Hospital, Madras, for giving me access to the records and to my colleagues at the General Hospital for invaluable help in the collection of the material on which this paper is based.

A DISCUSSION FOLLOWED —

Major J. R. Dogra, M. D., I. M. S., Officer of the Medical Research Department working under the Indian Research Fund Association at the King Institute, Guindy, Madras, described his researches on "Peptic Ulcer in South India". While explaining, briefly the lines of investigations, he pointed out the common defects of previous investigations both clinical and experimental in this country and stressed the importance of collecting reliable statistics and the dangers of drawing on the unreliable statistics available.

From a detailed study of 265 cases observed at the Government General Hospital, Madras, he showed that the gastric ulcer of the lesser curvature of the stomach was very rare, that duodenal ulcer of the first part of the duodenum was the commonest lesion associated in a certain number of cases with a pyloric ulcer and that the ulcer was almost always on the anterior wall of the duodenum. A majority of cases was associated with varying degree of duodenal stenosis and dilated stomach. Investigation of environmental conditions showed that all the cases were from amongst the very poor and mostly amongst Non-Brahmins. Whereas cases of fatal

haematemesis were rare, vomiting of small quantities of blood was present in 15 cases due possibly to the fact that the ulcers observed were on the anterior wall of duodenum in which fatal haemorrhage or profuse haematemesis does not occur unless the ulcer spreads to the posterior wall of duodenum and in turn involves the gastro-duodenal artery. He stressed that, clinically, cases in South India did not differ in any way to those observed elsewhere. Early cases in which there was no organic stenosis, typical symptomatology of hunger pain, tenderness and deformity of duodenal cap with a high acid curve, was found. In almost 85% of cases the clinical picture was typical of varying degree of duodenal stenosis with corresponding changes in symptomatology and fractional test meal findings.

With regard to the prevalence of the disease the speaker stressed the difficulties of such estimations. Owing to the extensive medical relief organisation, easy and cheap means of transport and markedly high percentage of literacy and great popularity of surgical treatment for dyspepsia in Travancore, conditions were considered ideal for investigating the

prevalence and distribution of the disease in that territory. From hospital records for 1938 collected from all over Travancore he showed that proved ulcer cases seemed to be uniformly distributed in Travancore.

Studies of records of hundreds of cases at Vizagapatam, Madras and West Coast (Neyyoor) showed that in spite of varied environmental conditions the disease picture was the same. Proportion of duodenal and gastric ulcer was 30 I, 34 I, and 29 I respectively.

Commenting on the evidence produced to show the greater prevalence of peptic ulcer in South India he pointed out that the number of operations done for the disease in any locality was no indication of the prevalence of the disease in that area. He showed that number of operations for this disease increased several hundred per cent soon after the arrival, in South India, of two pioneer gastric surgeons namely Bradfield and Sommervell, in Madras and Neyyoor respectively. Statistics showed that during the past years the number of operations for this disease was increasing rapidly in the provinces of Bombay and Punjab.

Mr T H SOMERVELL, Neyyoor, Travancore, said

"Since I came to India I have had experience of over 3,000 cases of these ulcers, the vast majority being duodenal (95%)

"First I feel I must supplement the remarks of Major Dogra on the etiology of this disease. I am of opinion that deficiency of vitamin, especially of vitamin A, is the chief dietetic cause of duodenal ulcer in S India

"Travancore is divided into two distinct halves, North and South of the railway line

between Quilon and Shencottah. Although the hospital where I work is in the extreme southern end of the Southern half of Travancore, yet 85% of our cases come from the Northern half of the country, although the population there is less thickly distributed. Moreover, in this Northern half of the land, duodenal ulcers are very uncommon among the fishermen of the coast, and a hospital on the coast between Quilon and Alleppey, surrounded by fishing villages, reports that the duodenal ulcer cases they deal with there do not come from among the fisher folk, but from the people who live a mile or more inland. The fishermen eat a good deal of raw fish, whereas further inland it is invariably cooked, this, together with dietetic considerations and with McCarrison's experiments, has led me to believe that the disease is mainly due to a deficiency of vitamin A. It is well known that this vitamin is responsible for the integrity of mucous membranes.

"In his most recent researches my colleague Dr Ian M Orr has come to the following conclusions

"Peptic ulcer in South India is the result of a diet deficient in protein and in vitamins A & B. The effect of this diet is to bring about changes in the myenteric plexus of the stomach and duodenum which bring about spastic, secretory and congestive changes in these organs. At the same time the lack of the protective vitamin A lowers the resistance of the mucosa to infection and leads to a lymphocytic invasion of the mucosa and hyperplasia of the lymphoid follicles which eventually rupture on to the surface forming microscopic ulcers. The effect of the hypersecretion, hyperperistalsis, and spasm is to delay or prevent the healing of these ulcers, which eventually coalesce to form one large, macroscopic ulcer."

'Regarding the distribution of duodenal and gastric ulcer in various parts of India, the following table shows this as a percentage of peptic ulcer admissions to total admissions in various districts ---

Neyyoor (Travancore)	10%
Madras General Hospital	2%
Bangalore	1.88
Miraj (Deccan)	1.52
Vengurla (West Coast)	0.46
Delhi	0.2

These statistics have been compiled from six hospitals situated in various parts of the country

Another interesting point about the ulcers in Travancore is that we hardly ever see a perforated ulcer. Out of our last 3,400 cases we have only had five cases of perforated duodenal ulcer

	D U Cases	Perforations	Percentage of perforations
Travancore	3,400	5	0.15
Madras, G H	6,000	89	1.5
Miraj (Deccan)	400	57	14.3

The abdomen of the Travancorean seems to be very resistant to acute infections. We operate on 15 to 20 acute appendices in the year, and 300 or more chronic ones. In Britain the proportion of acute to chronic appendicitis is at least twenty times as great. Here again Madras holds an intermediate position.

With regard to the operation done, I want to add something to what Dr. Menon said, although a few years ago I would have agreed with him, as I used to do gastrectomy for most of my cases of marked hyperacidity

(as shown by fractional test meals). Four years ago I wrote a paper (Brit. Journ. of Surgery, Oct. 1936) advocating gastrectomy as the method of choice for all cases of this type. Finsterer of Vienna with whom I have worked does gastrectomy for nearly every duodenal ulcer case, unless the pylorus is stenosed and the stomach contents show hypochlorhydria. Now however, I feel that for duodenal ulcer gastrectomy is, or should be, a "back number".

Mr. Hay of Manchester some three years ago found that if a sufficient number of the arteries to the stomach be tied, the acidity is reduced to a remarkable extent. Following his lead, I have been employing this method for all cases with hyperacidity, and so far the results have been excellent. Gastrojejunostomy is done in every case with a definite ulcer whether the pylorus is stenosed or not, and in all those whose test meal charts show hyperacidity, a tying of gastric arteries is done too. See Fig. 4. This only adds five minutes to the time of operation and seems to be devoid of risk. So far in about 100 cases I have had no deaths at all. I will show you the test meal charts, before and one month after operation, of six typical cases.

See table on page 16

From these cases, each typical of their class, it is seen firstly that tying of the arteries alone (without P. G. E.) does materially reduce the acidity to normal levels, (Case 1). We have found moreover that this reduction is permanent in nearly every case. In fact, it seems to be more permanent than in gastrectomy (unless a very large proportion of the stomach is removed). Several of our gastrectomy cases in which some two-thirds of the stomach was removed showed increase in the acidity some 2 or 3 years after operation. Two cases showing very marked hyperacidity. Hay has examined artery-ligature cases for a period of three years,

and found the reduction in acidity to be permanent. We have only been able so far to do this over a period of $1\frac{1}{2}$ years, but have found that at any rate for this period the reduction persists. Even if the acidity occurs after this time, tying of the arteries will have tided the patient over the dangerous period for recurrence, for the vast majority of gastrojejunal ulcers occur in the

CASES 5 & 6 show the great reduction in acidity after gastrectomy in comparison with a similar case in which excision of the ulcers with gastroenterostomy was done. But from the other CASES, 1 & 3, it is seen that this degree of relief from acidity can be obtained by the tying of arteries alone.

I am therefore convinced that as far as our knowledge goes at present, the tying of

Fig 4

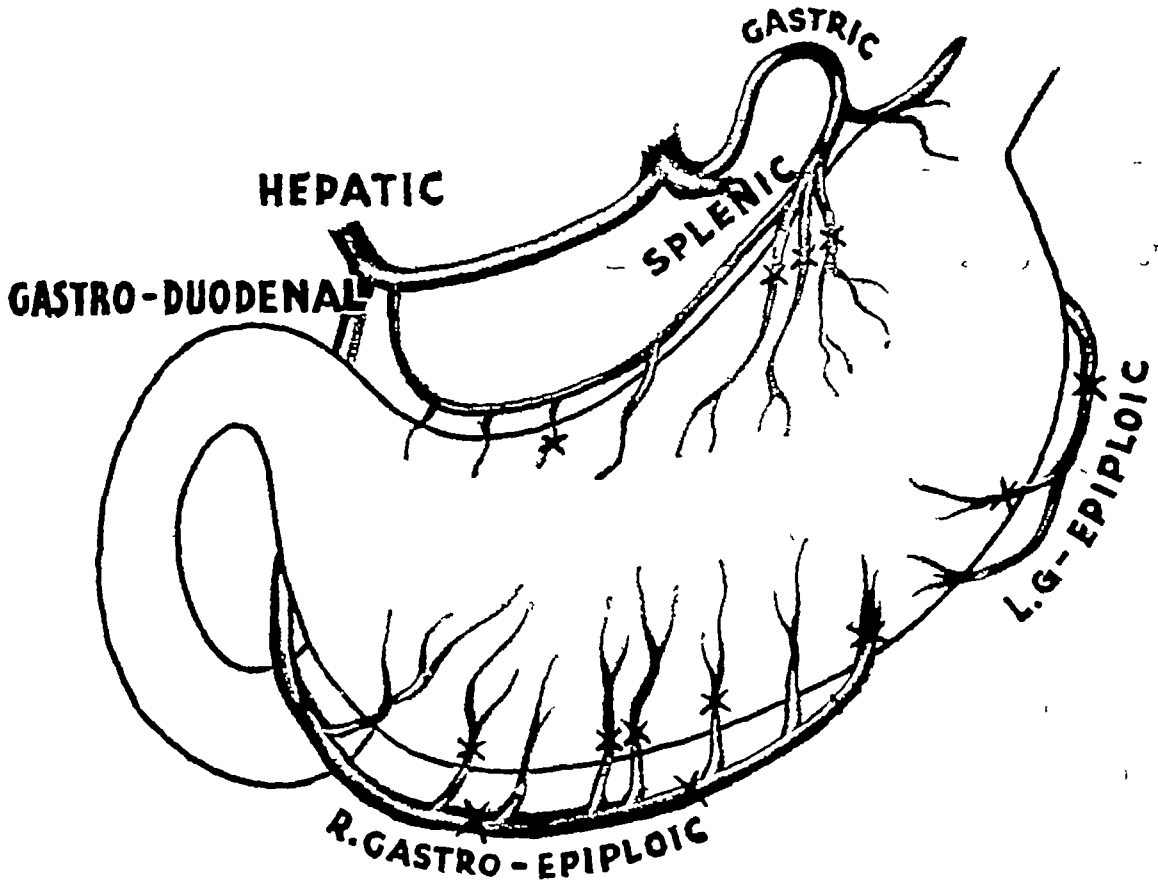


Diagram illustrating ligature of Gastric arteries.

first year or two after the original anastomosis operation.

CASE 2 shows that gastroenterostomy alone has some effect in reducing the acidity, but less effect than when combined, as in CASES 3, with ligature of the gastric arteries.

CASE 4 shows this reduction in acidity in a case of pyloric stenosis.

the arteries provided sufficient arteries are tied, has all the physiological advantages of gastrectomy while preserving the capacity of the stomach and being, unlike gastrectomy practically devoid of risk. I feel strongly that gastrectomy for duodenal ulcer is a back number, and I urge those of you who have cases of this nature to try this operation for a period of a few years, following up the cases when possible.

Regarding the operation for tying of the arteries Hay has laid it down that three-quarters of the arteries to the stomach should be tied, and I have found that this statement is correct, for there is not sufficient reduction in the acidity, if a smaller number of arteries are tied. No artery need be tied at the pyloric end of the stomach but from 2 inches on the proximal side of the pylorus to the highest point that can conveniently be reached on the fundus 3 out of every 4 arteries should be tied, as they leave the main vessels along the two

supply the anterior surface of the stomach. These should be tied. All the branches tied should be ligatured by means of a needle and fine silk or linen thread.

On the posterior surface of the stomach, it seems to be sufficient to tie three quarters of all the arteries that can be conveniently seen by pulling the stomach through a three-inch hole in the mesocolon, such as is made for a gastro-jejunostomy.

A slight purple coloration of the stomach wall is a sign that sufficient arteries have been tied. It is unnecessary to add

TABLE COMPILED FROM CHARTS SHOWN AT THE MADRAS MEETING

No	Case	Acidity		D U or	Pyloric stenosis	Nature of operation	Acidity after operation	
		Total	Free HCl				Total	Free HCl
1	Chelliah	100	0.33	Nil	nil	TA	20	0
2	Kasim	70	0.22	+	nil	PGE	60	0.15
3	Lonappan	70	0.18	+	nil	PGE, TA	30	0
4	Krishnan	93	0.26	+	+	PGE, TA	35	0.09
5	Mathai	60	0.16	GU	nil	Gastrectomy	14	0
6	Ramachandra	90	0.22	GU + GJU	nil	Exc + PGE	70	0.18

(P G E - Posterior Gastroenterostomy T A - Tying of arteries.

G U - Gastric ulcer G J U Gastrojejunal Ulcer)

curvatures. The right gastro epiploic artery should be tied in two places, but not before it has given off any branches to the anterior stomach wall.

The left artery can be tied in any place that is accessible, as it winds round to reach the front of the stomach. On the lesser curvature, there is always found a large sheaf of vessels coming downwards from the cardiac end of the lesser curvature to

that a test meal should be done in every case in which hyperacidity is suspected, before operation, and if possible it is desirable to do a test meal a few weeks after operation as well.

Dr KINI stated his experience was based on a series of 209 cases which were published in a paper in the October 1939 issue of the "Antiseptic" reprints of which were circulated. It showed the following figures with

regard to the incidence of gastric and duodenal ulcers

	Duodenal ulcer	Gastric ulcer
(A) Proportion of duodenal ulcer to gastric ulcer	30.4	1
(B) Proportion of duodenal ulcer to combined gastric and duodenal ulcer	23.7	1

The majority of the gastric ulcers are associated with duodenal ulcers as well as with marked obstruction. The duodenal ulcer is the earlier to occur and the gastric ulcer is a later manifestation. Vitamin deficiency plays an important part in the causation of the ulcers. Experimentally, the research scholar in Andhra University was able to produce chronic ulcers in puppies fed on vitamin B free diet.

The speaker found that in 15% of operated cases there was enlargement of the mesenteric glands and it was difficult to find out the cause of such enlargement histo-pathologically and bacteriologically. On referring to McCarrison's work it was found that in monkeys fed on vitamin free diet, enlargement of mesenteric glands occurred and it is presumed that the enlargement of glands found at operations is due to avitaminosis, as the basic diet of the poor working class man is very poor in these essentials.

He illustrated all the peculiar types of gastric and duodenal ulcers and the

condition of the patients before and after operation. He also demonstrated three peculiar kinds of granulomatous ulcers which he had published in the British Journal of Surgery which on histo-pathological examination proved to be granulomatous but not typically tuberculous.

✓ He stated that haematemesis as a complication of gastric and duodenal ulcers was rare in his series except in one case of gastric ulcer which responded to the ordinary lines of treatment. This was subsequently operated on, a gastro-enterostomy employing Roux's technique being performed.

He stated that in recent years, Dr Govindan Nair of Vizagapatam had demonstrated a series of cases where he found angular stomatitis and rawness of the tongue associated with a thickening of the skin of the genitals and dyspeptic symptoms which he has described as "Oro-genital syndrome". These patients when fed on the hospital full diet, which was by no means a very satisfactory diet, improved very considerably with relief of symptoms. These cases illustrate the deficiency in the dietary of the poorer classes.

He said that bio-chemical analysis was very useful and in his series of cases was a helpful guide. He was very much indebted for the careful way in which it was done, to Dr V K Narayana Menon, the bio-chemist. With a view to find out the relationship of appendicular disease to duodenal ulceration 168, appendices were removed and the following statement shows the result of pathological examination—

Type of Appendices removed	Nos in—	1932	1933	1934	1935	1936	1937	Total
Appendices normal	8	19	16	23	8	8	82	
" sub acute		5	3	2	5	9	24	
" obliterative	4	10	9	10	12	2	47	
" with eosinophilic infiltration					1		1	
" with thread or whip worms		1	3	1	2	1	8	
" fibrosed		1		1	2	2	6	
Total	12	36	31	37	30	22	168	

15 cases showed Wilkie's abdominal triad, a duodenal or gastric ulcer associated with chronic cholecystitis and appendicitis

He stated that to evaluate the results of different types of operative technique and the success of the operations, a follow-up system is quite necessary. He next showed the results of his follow-up system and adduced reasons why the follow-up system in India is not so successful but he hoped with better arrangements the real truth with regard to the success of surgical intervention will be found. He stated however that the majority of the cases who replied or reported were keeping good health while living under the same conditions as before the operation.

Lieut Col V MAHADEVAN, IMS said "Certain points about peptic ulcers have not been brought to the forefront of the discussion as they ought to have been. Sitting in the out-patient departments of mofussil hospitals and listening to the history of patients, help us a great deal to know the subject. It is only there, we learn the causation of these ulcers.

A certain amount of careful investigation shows that in all cases of gastric and duodenal ulcers, the patients complain of high acidity of the stomach which manifests itself in the form of acid eructations, heart burn, pyrosis. This is their first complaint and in such cases, medical treatment alone relieves, though some of them later may develop into ulcers. From this it becomes clear that acidity is the real cause or the one most important factor in the production of these ulcers. These ulcers, therefore, should be called Acid ulcers. If this view is conceded, I should consider an operation in the early stages is really not for the benefit of the patient. You heard yesterday that gastrectomy had been done in some of these cases. This has been given up simply because it did not do any good. I should say, that we should leave these cases to the

physician. I consider operation is not indicated when there is hyperacidity. With due apologies to Dr Somervell I would like to ask him how long it takes for the gastric collateral circulation to completely establish itself after ligation of gastric vessels. If it happens in about two months, say, is it worth while doing this operation? We know hyperacidity is not a continuous process but is periodic. The patients get hyperacidity and with treatment or without treatment, they all get well. I have not done the operation of tying the vessels for hyperacidity but at the same time it is worth while knowing how long the ligation will stop the blood from the stomach.

When cases come with obstruction, it means that the original cause i.e. hyperacidity is completely cured because if it still existed there would not have been any scar formation which is a sign of healing of the ulcer. In such cases what is done is only a short-circuiting operation.

We admitted 199 cases of acid (peptic) ulcers during a period of 1 year and 3 months. All of them were not operated upon, 56 of them left the hospital without getting operated. These cases evidently were not in a really advanced stage of obstruction. Of the 14 cases operated upon we had only two gastric ulcers. One was a woman who had perforation leading to adhesions to the anterior abdominal wall. The other was a man. The proportion of gastric ulcers to duodenal ulcers varies so much with different observers.

Another point which I would like to point out is the proportion of perforated ulcers amongst these cases. In this period out of the 199 cases, 11 were perforated which is really a high percentage compared to Dr Somervell's 4 to 3000.

Coming to cases of acute appendicitis, there were 26 cases during this period,

which is really not a small figure—and of these 6 were cases of appendicular obstruction—and shows that appendicitis or acute appendicitis or even a reaction of the peritoneum is not extremely rare in this country. But this is very different from what Dr Somervell told us yesterday, about acute conditions in the abdomen. I should not put the incidence of these acute conditions down to civilisation. There may be other causes behind this. I am sure that in Tamil Nad there may be other causes working than civilization. Tamil Nad is not more civilized than Travancore. It was observed that the Brahmins do not get stomach troubles. Evidently ulcers occur mostly in cases where people do not get a square meal a day. Madras Presidency, being the poorest of the Presidencies in India, has the greatest incidence of duodenal ulcers.

Col M. M. CRUICKSHANK, I M S remarked that he did not think such factors as diet or habits could be considered as causes of peptic ulcer. Diet for instance had been blamed but these patients after operation return to the same diet which they enjoyed before operation and yet recurrences of ulceration were of great rarity. Jejunal ulceration also was a rare condition and if diet, habits etc., had anything to do with the causation of duodenal ulceration then one would expect recurrences.

Col Cruickshank put forward the idea that the reason for the paucity of recurrences and of the development of jejunal ulceration was because in the Madras Presidency the people possessed a normal gastric mucosa.

He suggested as a point for consideration the statement, that the healing power of the duodenum depended on a normal gastric mucosa and that the condition of the gastric mucosa depended on the

patient's work or occupation and habits. In industrial centres gastric ulceration and jejunal ulceration were commoner than what obtains in agricultural areas.

Major Dogra I M S had reported histologically on the gastric mucosa of cases operated by Col M. M. Cruickshank and in every instance normal histological report was forthcoming, supporting Col Cruickshank's statement. Col Cruickshank pointed out that if a niche were seen in an X-ray film, an ulcer cavity of such depth lined with granulation tissue, could never heal and operation was indicated. He further affirmed that a pathological condition of the appendix delayed healing of duodenal ulceration, a point in favour of routine appendectomy.

Discussing the technique of gastro-jejunostomies Col Cruickshank laid stress on the necessity of stitching the edges of the stoma in the transverse meso-colon to the posterior wall of the stomach, citing a case where these stitches had given way with the result that the duodenum insinuated itself into the lesser sac and became adherent to stomach, necessitating a partial gastrectomy for the relief of pain.

He was against the operation of partial gastrectomy for duodenal ulceration and felt that in a Hay's operation, where the blood supply of the stomach was cut off, the gastric mucosa would suffer and upset the healing powers.

Speaking of haematemesis before operation, he advocated the line of treatment laid down by Meulengracht, namely that haematemesis should be treated by feeding the patient, by blood transfusion and the avoidance of morphia.

A second haemorrhage might be operated on with success but a third haemorrhage treated surgically showed a death rate of

approximately 70% and should therefore be approached with great circumspection

Mr MOOLGAVKAR said that in his experience of over 16 years in Bombay he had not done more than about 45 gastro-jejunosomies for peptic ulcer. At the J J Hospiual not more than 12-15 gastrojejunosomies were done in a year. He must say however that about the same number of perforations were dealt with

He wanted to know from the extensive experience of the southern surgeons as to what was the best variety of gastro-jejunosotomy and what was the best situation for the stoma? Whether it being nearer the pylorus or the cardia made any difference in the results? What should be its size and inclination? Whether they encountered any cases of vicious vomiting or of haematemesis after the operation? If as has been suggested vitamin A deficiency is the cause of the ulcer, whether vitamin A has been tried as a treatment before operation and if so what are the results?

He instanced a case of duodenal ulcer which he had operated on recently. The stomach was small and a posterior-gastro-jejunosotomy was done nearer the fundus than usual. He did very well for four days. On the sixth day he started vomiting and could retain nothing. On the eighth day a Ryle's tube was passed in and retained for two days. Thirty six hours after removal of the tube vomiting started again, the Ryle's tube was passed in and retained again. After the stomach was emptied of the greenish yellow material, ten ounces of water was passed in and the tube clamped for half an hour. The clamp was next released and the tube allowed to drain for half an hour.

It was found that the quantity injected came out. 10% glucose was next injected instead of water. It was found that twelve ounces instead of ten drained out afterwards

proving that nothing went through. The abdomen was opened up and the anastomosis examined. The proximal loop was a little larger than the distal. At this point however the patient collapsed and had to be rapidly sewn up. Next day, after twenty four hours of continuous glucose drip and a blood transfusion, he was opened up again and the jejunum divided distal to the anastomosis and the ends closed. The free jejunum was next anastomosed to the stomach anteriorly, an anastomosis was also established between the jejunum and the proximal loop of the previous anastomosis. This was very troublesome. The patient felt better and had no further vomiting. Fourth day after the 2nd anastomosis the patient had a sudden severe pain in the epigastrium and collapsed. A perforation was diagnosed. After reviving remedies, he was operated two hours later under local anaesthesia and the perforation sutured up, the fluid swabbed out and the pelvis and right flank drained. He died from pneumonia on the 6th day of the last operation, the abdomen not being distended.

Another case recently operated on at the J J had severe haematemesis after operation.

Dr N S NARASIMHAM, F R C S said "The frequency with which gastro-duodenal ulcer occurs in the population is a surprising fact. Pathologists reviewing the autopsy material throughout Europe and America find that roughly speaking 5 to 10% of adult bodies when examined at death, show either active peptic ulceration or the scars of healed ulcers. This is an international and cosmopolitan affection. There is no post-mortem observation published either in the paper of the Far-Eastern Congress in Calcutta (1928) or in the paper by T. H. Somervell (British Journal of Surgery Vol XXIV, No 94 1936).

The bodies on which autopsies are performed are destitute. I was allowed by the

kind permission of the professor of pathology to go through the post-mortem notes. There were 69 autopsies out of the total 685 in the past 8 years on cases of peptic ulcer that died in the surgical and medical wards.

It is important to bear in mind that there were three cases of carcinoma of stomach out of the total of 8, between the ages of 21-30. There were three females out of 61, with a large gastric ulcer (age 80), a gastric and duodenal ulcer (age 40) and a duodenal ulcer (age 50). This last had liver focal necrosis and a high blood urea finding.

The age group of 11-20 in males showed 8 ulcers, there was one gastric and duodenal and 7 duodenal, one ulcer was healing and one was acute after ileo-colic anastomosis.

Between the ages of 21-30, there were 26 males. There were gastric ulcers in 2, one was healing and in the other mesenteric glands were enlarged. There was a gastric and duodenal ulcer in one. Pyloric ulcer was found in 5, there were two pyloric ulcers in one instance, one case died of tuberculous enteritis. Duodenal ulcers were met with in 12, 4 were posterior, duodenal ulcer with healed ulcer of pylorus in 2 instances. In a cerebral abscess case there was a healed ulcer of the first part of the duodenum. One operated case of duodenal ulcer had developed tuberculous disease of ileum.

There was pus in tonsils, with enlarged spleen and diffuse hepatitis in one. Another showed enlarged spleen and all the lymph glands of the abdomen enlarged.

In the age group of 31-50, there were 19 males. Gastric ulcer was found in 3. Gastric and duodenal in 1, duodenal and pyloric ulcers in 3 and duodenal and jejunal in one, duodenal only in 12, one

case of duodenal ulcer was found healed 6 months after posterior gastro-jejunostomy.

In the age group of 51-60, there were 7 cases, saddle-shaped gastric ulcer was found in 2, amongst these 2, one had stomal ulcer 3 days after operation. Duodenal ulcer was seen in 5, one was active, one healed, two ulcers half an inch apart were found in one, after gastrectomy, there was leakage of duodenal stump, leakage from gastro-jejunal anastomosis with gangrene of portion of transverse colon.

At the age group of 61-70, there were 3 cases, gastric and duodenal was found in 1, in two, anterior ulcers were found and of these two in one there were two ulcers half inch apart.

While ulcer is more commonly seen in the middle decades of life, if the total duration of symptoms is taken into account, it is found that the ulcer begins in the earlier adolescent period. Its onset is traced to the period between 10 and 30 years of life or 10 and 20.

This is important from a prophylactic point of view. I have met with several cases where the disease began at the age of 10.

✓ The prophylactic measures though simple are—2 hourly small feeds, removal of septic foci as tonsils, carious teeth, correction of unbalanced diet, regulating hours of work and study.

The following data are gathered from the study of the autopsy findings.

- 1 In all the cases of advanced anaemia, and in septic cases such as prolonged empyema, bronchiectasis, suppuration in kidneys or bones there were no ulcers.
- 2 3 Cases of pancreatic calculi were noted (Pyloric ulcer 1 Tub ileum 1)

3. Re Technique —

- a Sutures held well even in the presence of diffuse peritonitis except in one case
- b leakage from duodenal stump was noted in 3 cases
- c Abscess at appendicular stump—1
- d Bleeding at the site appendicectomy—1.
- e, Gangrene of transverse colon—1
- f Haemorrhage from suture—1.
- g " from original ulcer 1
(Thrombosis of mesenteric vein)
4. Stomal ulcer in 3 days
- 5 Focal necrosis of liver—7 with high blood urea
Atrophied liver—2
Fatty degeneration of liver 1
- 6 Development in 3 days of acute duodenal ulcer after ileo-colic anastomosis.
- 7 Duodenal ulcer in a cerebral abscess case probably a coincidence
- 8 Duodenal cases developed T. B of ileum.
- 9 One duodenal ulcer case had pus in tonsils, splenomegaly, diffuse hepatitis
- 10 Duodenal ulcer and splenectomy
- 11 Duodenal ulcer and haemorrhage into pancreas
- 12 Ascitis after gastrectomy
- 13 Liver and all glands enlarged
14. In spite of the fact that the bodies are destitute bodies, in several instances, healed scars of ulcers were seen
Perforations are common in Madras 25 years ago the condition was not diagnosed Now most practitioners in the city spot it in one hour or two and the patients themselves readily come into the hospital for operation
Out of the 43 perforations, 5 were gastric and 38 were duodenal, all the

gastrics were males, there were 2 females amongst the duodenal perforations

Living Pathology When the abdomen is opened, the abdomen is explored and all the pathological findings are noted

The following are some of the findings in my cases in one series of cases

Age group of

1-10	Liver cirrhotic	1
	Enlarged mesenteric glands	1
" 11-20	Liver cirrhotic	3
	Enlarged mesenteric glands	5
	Lane's kink	1
	Adhesions of omentum in the Rt 1 Fossa	1
" 21-30	Adhesions in the lesser sac	2
	Liver cirrhotic	7
	Enlarged liver	3
	Enlarged mesenteric glands	4
	Free fluid in abdomen	1
	Duodenum-non-rotation	1
	Transverse colon full of arches	1
, 31-40	Liver cirrhotic	4
	Enlarged mesenteric glands	2
	Transverse mesocolon very short and fatty	2
" 41-50	Liver cirrhosis	2
	Band from meso-colon to superior mesenteric vein	2
	Duodeno-jejunal flexure fixed by adhesions	1

In a recent series of 17 cases, the mesenteric glands were enlarged in 15, mobile caecum was seen in 2 instances

In view of the enlarged mesenteric glands here, which is not a common finding in European countries, I investigated the prevalence of dysentery, their motions were examined as a routine and the blood agglutination tests were done as a routine in 50 cases
The results are —

Shiga + Nil

Flexner + 1 in 25 = 1 Case

1 in 50 = 7 Cases

1 in 100 = 1 Case

1 in 250 = 1 Case

Both positive - Nil

Both negative - 40

The serum reaction in 857 peptic ulcer cases was positive in 4% while the general result for the whole surgical ward is 12% positive

Constipation is a common symptom and this indicates a greater preponderance of the disease in Vago-tonics. The lower incidence of the disease in Java is attributed to the lower nerve tension at which the natives live i.e. most of them were sympathetico-tonics, but I have noted gastric ulcer in cases of thromboangeitis

The rarity of haematemesis is mentioned but if careful history is elicited, haematemesis of a mild type is common (not less than 10%). Haematemesis is more dangerous in the 50 to 70 age group, probably it is due to sclerotic changes in the artery, age is therefore an indication for operation

In this country there may be different factors in the causation of ulcers

- 1 Excess of acid
- 2 Constitutional type, there is a familial tendency as well
- 3 Chemical

Administration of various drugs as metallic preparations of the indigenous medicines, quinine in malarious areas

- 4 Infective, after acute tonsillitis
- 5 Vagotonics, smoking, this interferes with alternate periods of rest and of secretory and motor activities of the stomach
- 6 Nutritive—due to want of vitamin C leading to capillary fragility

✓ 7 Traumata—as lifting, straining, bending, squeezing—leading to intrabdominal pressure

Dr V R SANZGIRI (Bombay) said
“The experiences which we have heard so far have been very illuminating and has stimulated in us a desire for keeping a correct record of our surgical work thereby making a beginning for research in the field of surgery in future and we hope to give a detailed account of the different subjects which we would investigate at the next meeting of our conference

My personal experience of the gastric and peptic ulcers is very meagre. This disease is not so common in Bombay. Of the interesting things which I have noted in patients suffering from gastro-duodenal troubles is that in the first instance the majority of cases which came to me personally were between the age group of 20 and 30, secondly that the patients were not at all undernourished. ✓ The peculiarity of the history shows symptoms of chronic appendicitis and which may be a potent cause of gastro-duodenal ulcer. The history is very characteristic. When any fluid drink such as coffee or tea is taken, as is done the first thing in the morning by many, the moment the fluid goes into the stomach, you do not get any signs of distension of the stomach or anything like that, but a little hyper-motility of the stomach gives rise to pain in the right side of the abdomen which is very characteristic and whenever a patient complains of this pain or discomfort in the right iliac fossa, you have a clinical finding of some importance. I will call this the gastro colic reflex. After doing a gastro-jejunostomy we find that the appendix in a majority of cases stenosed, a definitely pathological finding, therefore, I remove the appendix

Another thing is the peculiar X-ray evidence. After giving barium meal the

motility of the stomach is watched under the screen and we find there is hyper-motility of the musculature of the stomach

When you are screening the stomach the greater curvature of the stomach forms a little notch towards the site of the ulcer

✓ As regards vomiting, it has been said that vomiting is a very important symptom in Madras. Unfortunately, it is not very characteristic in Bombay. But nausea is more often seen. People feel a little fullness of the stomach giving rise to discomfort more than actual pain.

Another thing is hunger pain. This also is very characteristic in our duodenal cases. I am surprised that Madras surgeons have not given any importance to this sign. I do a posterior gastro-jejunostomy. The real indication for this operation is pyloric stenosis giving rise to obstructive symptoms.

Dr R MAHADEVAN FRCS said that leakage of the duodenal stump after gastrectomies is believed by some to be due to vitamin C deficiency and that it can be prevented by proper pre operative preparation and administration of ascorbic acid. He invited opinion on this point.

Dr E S GOPALAN (Coimbatore), then put forth some clinical points in connection with the duodenal and gastric ulcers. "As regards the tying of the arteries and the relief which it has certainly given in Dr Somerell's cases, I would like to make this suggestion, viz, tying of the arteries also means the cutting off of the sympathetic nerves.

Another thing I have noticed in the out-patient department is the ease with which you can diagnose a patient with peptic ulcers. You can diagnose a case of typical pyloric obstruction from a distance without asking the patient anything. The usual type

is a patient between 20 and 30 or a little more, somewhat emaciated, with perfectly clean teeth but walking drooping and with a hand on the epigastrium. This is absolutely typical. As regards the Brahmin question raised by Col Mahadevan, I M S, the brahmins form 2% of the population and I should say that the average brahmin is certainly better fed than the average of other classes. Even the poorest brahmin takes some milk or milk product. In my experience here on the investigations on diets and also in my rural work, I find that many people in the rural parts do not know what milk is. They are mostly Harijans.

Another point is about the differential diagnosis. An early pregnancy in an elderly widow, who had symptoms mimicking pyloric ulcer, cheated us. We opened the abdomen and found a physiological tumour of the uterus. The Zondek test done later was positive. I have noted that cases of early tuberculosis have been diagnosed as cases of peptic ulcer. Some cases have been put on the table and operated with disastrous results. Recently I had a case in my practice. It was a manifest case of T B of the right lung but treated by some practitioner with 50 injections of Larostidin. In my view there is no justification for fooling patients with Larostidin.

As a matter of interest to you I shall mention to you about a case of total gastrectomy done by our President (Col Pandalar, I M S) with immediate success. We opened the abdomen and found a typical leather-bottle stomach. In this particular case the operation took two hours. The oesophagus was anastomosed to the jejunum. The patient was kept for a long time and did well. A section of the leather-bottle stomach showed the usual picture of scirrhus type of carcinoma. In this case, the stomach wall was $1\frac{1}{2}$ " thick.

Another patient, a diabetic, developed after some years pyloric stenosis. The diabetes disappeared. We did a gastro jejunostomy, removed his gall bladder and subsequently he did not develop diabetes.

As regards the question of primary chronic or appendicular disease causing gastric troubles, in a few cases, the appendix could be incriminated but the majority of cases had no demonstrable appendix lesions."

Dr P RAMA RAU then pointed out some of the radiological aspects of the subject under discussion, viz, peptic ulcers.

Today one can with a great deal of accuracy demonstrate direct evidences of peptic ulcers by radiographic investigations. The best method of doing it is by making a study of the rugae of the patient's stomach i.e. the pattern of the mucous membrane folds.

Give a small quantity of barium, and after gently massaging the stomach, apply compression under fluoroscopic control. The mucous membrane folds then open out with barium in between. The rugae in normal cases are longitudinal and parallel along the lesser curvature, and along the greater curvature they are transverse. In cases of ulcer, the rugae converge towards the site of the ulcer. An active ulcer shows converging rugae and a spastic incisura in the greater curvature of the stomach due to spasm of the transverse mucosal folds. In a chronic ulcer we get a typical ulcer niche, converging rugae and more fibrous incisura of the greater curvature giving an hour-glass appearance. When an ulcer has healed, the niche disappears, but the converging rugae held by the scar, remain.

In cases of ulcers which turn malignant, there is a certain amount of infiltration in the stomach wall around the lesion which makes that portion of the stomach rigid.

We find under the screen that for about an inch under the ulcer craters there is a crescent-shaped region with no barium at all, the rest of the stomach being quite pliable on palpation. This is described by the Americans as the "Meniscus sign." Duodenal ulcers can also be demonstrated with ease by serial radiography. We find the typical deformed cap caused by cicatrization due to the ulcer.

When there is a spastic deformity due to reflex spasm a second examination is made. 1/100 th grain of atropine is given orally, 45 minutes before the barium. When the patient complains of a dryness in the mouth we know the atropine has acted and the spasm, if any, is relieved. If there is no ulcer, a normal triangular cap is seen.

Between the 7th and 10th day after operation in a gastrectomy or gastro-jejunostomy, we radiograph the patient to find whether there is any spasm in the stomach. If there is no spasm or tenderness, all is well.

In cases of hyperacidity, before or after operative procedure X-ray exposures will give a lot of relief. It diminishes the acid secretions of the stomach and by the depressant action on the vagus, relieves spasm also — 180 K-V 1/2 mm Copper and 1 mm aluminium filter, 600 R given in four fractions on four consecutive days. They were adopting this procedure in Vienna as part of the medical treatment of peptic ulcers.

If one carefully looks into a suspected case of perforation, gas between the diaphragm and liver is visible in a plain radiogram taken in the erect posture.

It was said that ulcers in the region of the small intestines are not visible in radiographs. But, we get a definite segmented appearance of the coils of the ileum in early tuberculous ulcers due to spasm at the

Straw

seats of ulcer In chronic ulcers, radiographic examination is more useful—we get dilated loops of the ileum, between cicatricial stenosis due to ulcer.

Dr Joshie of Delhi asked whether radiotherapy could be adopted (as suggested in a conference in Delhi) for treating gastric ulcers Dr Rama Rau answered that radiotherapy is not a curative treatment, but is only an adjuvant to other methods, in pre or postoperative medical care of the cases

Dr S B GADGIL, F R C S, said that, the etiology of gastric ulcer very much depends upon the individuality of a person rather than on a district or province of India from which he comes Of two men taking the same diet one may suffer from gastric ulcer while the other does not do so.

As regards gastric ulcers the number shown by the Madras surgeons is very much more than the Bombay surgeons, not because the ulcers are less in Bombay than in Madras but because the physicians there would not hand these cases over to the surgeons as readily as they do in Madras

It has been said that perforations are more common in parts where ulcers are treated more medically than surgically and the fact is borne out by the Bombay records where surgeons get more cases of gastric perforations than in Madras No one has said anything about smoking habits septic foci in teeth, tonsils, gall bladder or appendix as the causation of gastric ulcer In finding the real cause of gastric ulcer all these facts will have to be taken into consideration besides hyperacidity of the stomach, about which so much has been said.

Dr R N COOPER (Bombay) said that his observations during his travels convinced him that some of the surgical diseases had a geographical distribution Thus gall-bladder diseases were common in Bengal peptic ulcers were common in the

south of India and urinary calculi were common in the Bombay Presidency

Again a reference to the literature coming from Europe, England, America and our own country showed that there was a difference in the pathology of gastric ulcers seen in these different parts This difference accounts for the different types of operations simple anastomosis, excisions etc, recommended by different authorities in these different parts of the world Thus in Bombay the surgeons saw a relatively greater proportion of acute ulcers and perforations In Madras these ulcers were seen among the poorest of the poor In Bombay, this was not so In America these ulcers were seen amongst all classes The members of the legal and medical profession who lead a life of great nervous strain are often the subject of this disease Again it seemed peculiar that some people were marked out for a recurrence of the disease in the shape of jejunal ulcers He saw a case operated for the fifth time in America for such a recurrence He had had a posterior gastro-jejunostomy, then an anterior gastro-jejunostomy, then a partial excision etc He underwent nearly complete resection of the stomach, with splenectomy and a partial excision of the pancreas during his fifth operation

These considerations made him think that several other factors were involved in the pathology of peptic ulcers which had escaped notice Another thing that struck him was the ease with which surgeons in Madras during an operation could pull the stomach out of the abdominal wound This was due to the fact that this viscus seemed to be large in size In Bombay, he found that the stomach was small in size

High tuberculous lesions of the ileum closely mimicked the symptoms of duodenal ulcer

He narrated two cases of ulcer pain, with slight haematemesis and persisting

filling defect under X-Ray, occurring in pregnant women. They were left alone. Symptoms and signs terminated with the end of pregnancy. Subsequent observations over a period of two years showed them to be free from all symptoms.

Dr C P V MENON replied to some of the points raised during the discussion. He did not agree with Major Dogra who said that almost all the duodenal ulcers were anterior. This impression was probably due to the fact that it was the anterior wall of the duodenum that presented itself most prominently to the surgeon. In the majority of cases the ulcer is posterior with extension of the cicatrization anteriorly and can be felt as an indurated lump adherent to the head of the pancreas and often is the size of a lime. Sometimes there is an anterior as well as a posterior ulcer. The postero-superior aspect of the first part of the duodenum is in his opinion the commonest site.

Again, the proportion of gastric to duodenal ulcers in his series was at least twice that in Major Dogra's. There might be two possible explanations for this difference. It is not unusual to find in a case sheet marked as 'Duodenal ulcer' in the "Diagnosis" column, the operation notes saying that the ulcer was gastric or that there was a gastric ulcer in addition to a duodenal. Again, it is possible that some gastric ulcers have been missed, not having been looked for. It is the practice in the unit from which his own figures were compiled, to make a careful examination of the stomach for ulcers even when there is a well marked duodenal ulcer.

Of Dr Hay's operation of ligation of the gastric arteries to reduce the acidity, he had no experience.

In reply to Dr. Moolgavkar, he briefly described the technique of gastro-jejunostomy

and said that post operative haematemesis and vicious circle vomiting were extremely rare, and attributed it to the no-clamp method.

With regard to the size of the ulcer and malignancy, he has seen some very large ulcers which were definitely non-malignant. The situation of the ulcer in the pyloric portion, on the other hand should suggest malignancy. Even here, in two recent cases where the malignancy was suspected from the prepyloric position of the ulcer, the pathologist reported no malignancy and in another case where the resected specimen looked typically a chronic ulcer, malignant changes were seen. All these cases were treated with partial gastrectomy. In reply to Dr Sanzgiri he said hunger pain was characteristic of the early stages of the disease and was not a marked feature of cases with stenosis and the majority are of this type.

He agreed with Dr Gopalan that Larostidin was useless and was even dangerous, in that cases might be treated without proper investigation and valuable time may be lost in a possibly malignant gastric lesion.

President Col PANDALAI remarked — "During the last 2 days we have been listening to a discussion on one of the most common diseases of South India. Those taking part in it are men with great experience, second to none elsewhere. We all know that South India is not the only place where this condition occurs and that it is a universal disease. I am not, therefore, prepared to dogmatise on the pathology or treatment of the disease. My own practice has been in these parts and here among all races and communities it is quite prevalent. Perhaps it is more common than we think, for with more operating surgeons and more hospital facilities than are now available the number coming to operation will I believe be larger

It used to be said when I was a student that acute appendicitis was a disease of Europeans. Enlarged prostates were not then known among Indians. But we now see large numbers of both these conditions in our practice.

The subject of Peptic ulcers is so vast that it is impossible to do full justice to it in two days. About its etiology and pathology we are still speculating. Fortunately our discussions have been of a clinical nature and whatever might be the exact pathology, one thing is certain, that we are able to diagnose and treat the disease, although we do not know the cause in the same way as, although we do not know the cause of cancer, we are able to treat cancer and do a great deal of good to the sufferers. The treatment of peptic ulcer is mainly surgical but it is not right to say that it is entirely a surgical disease. It is combined medical and surgical treatment that is going to be most beneficial to the patient. We should show our great appreciation of physicians who see these cases before and after us. A great many of these cases when in the agony of pain are benefited by medical treatment. There is no specific medical treatment. It is purely symptomatic. Alkalis, Pepsinogen

and injections of non-specific proteins e. g. Larostidin are of benefit frequently, especially in the early stages but altogether my experience of injections is not a happy one. If such treatment, after a reasonably prolonged trial is not beneficial, it should not be persevered with and surgery should be given a chance. Most of us are familiar with the tragedies of prolonged misguided medical treatment when the diagnosis may be wrong and the case in hand may be one of cancer.

The place of surgery in this disease is established, especially when the ulcer has produced its well-known complications. In such circumstances, surgery gives the only possible relief to the sufferers and should not be delayed.

When a patient is operated on for a peptic ulcer, it would not be right, for us, with our present knowledge of its pathology, to say that he will not have a recurrence of the disease and that he is permanently cured. We do not know and cannot remove the cause of the disease. We should always advise the patient to be careful and take all possible precautions to prevent irritation or over loading of the stomach in later years.

PYOGENIC INFECTION IN DIABETES

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Pyogenic infection in diabetes is so common and important that the surgeon cannot afford to ignore the most important points in its etiology, chemistry and treatment. It is often said that the treatment should be carried out in consultation with the physician. No doubt, it is the best way, but the best is not always available and sometimes it is not possible. It is imperative for the surgeon to understand this complicated disease in order properly to treat its surgical complications.

HISTORY —The description of the symptoms polyuria, polyphagia, polydipsia and the application of the name diabetes, literally 'to pour through a syphon' belong to the first century. The symptomatology and the prognosis of diabetes are found in the writings of Celsus (in 25 A D). The name 'Diabetes' was given by Aretaeus (in 30 A D). A search for the mode of origin followed the recognition of the disease, and Galen (130 A D) naturally enough attributed it to dysfunction of the kidneys.

The honour of finding the sweetness of urine in this disease, goes to Sushrut, who described the same in the 6th century and named the disease as "Madhu prameha" or "Honey urine". He noted the prevalence of diabetes in the rich and attributed it to over-indulgence in rice, flour and sugar. Carbuncles and tuberculosis were known to be its frequent complications. The first neurogenic hypothesis and an increase in the knowledge of the complications is ascribed to the Arabian clinician Avicenna (980 A D). He believed that gangrene was due to retarded circulation and that spreading of this lesion ended fatally.

CHEMICAL KNOWLEDGE —The chemical concept came with the discovery by Paracelsus (1493), who found that the urine of the diabetic patient yielded much residue on evaporation. The true nature of the residue was not discovered till 1815 when Chevreul identified it as glucose. The presence of other important substances in diabetic urine followed at a much later date. In 1857 Peters discovered that acetone was frequently excreted in diabetes and in 1884 oxybutyric acid was found by two independent observers—Kulz and Minkowski.

The theories of the causation of diabetes were many, kidneys, liver and the nervous system were blamed in turn. Pancreatic pathology was described by Cawley in 1788.

THE LABORATORY TESTS,—The respiratory metabolism, quantitative and qualitative estimation of sugar in the blood and urine, advance in the knowledge of carbohydrate metabolism and acidosis were largely the contributions of the late nineteenth and early twentieth centuries. Claude Bernard was the first to experiment and describe the hyperglycemia and glycosuria caused by the puncture of the fourth ventricle.

Minkowski and Von Behring succeeded in producing acute and fatal diabetes by extirpation of the pancreas in the year 1889. The twentieth century dawned with the discovery of the hydropic degeneration in 1901 by Weinselbaum and the localization of the site of the pathology of diabetes in the islets of Langerhans by Opie and Szobolew who thus originated the insular hypothesis.

DISCOVERY OF INSULIN —Early attempts were made by Zuelzer in 1908 to

prepare alcoholic extracts from the pancreas which were capable of diminishing glycosuria in animals. Various other experimenters tried the same before 1921 by using various methods for preparing the pancreatic extract which would reduce blood sugar. The active pancreatic extract was discovered by Banting with the co-operation of Best in the laboratory of MacLeod in Toronto, from pancreas in which ligation of the pancreatic duct was done to cause atrophy of the acini secreting digestive juices. Thus insulin was obtained from the islets of Langerhans in 1921. A new era was introduced by the discovery that the pancreas of the fetal calf under five months' development did not contain the digestive pancreatic juice, but did possess the internal secretion.

INCIDENCE —There is enough evidence in the medical press of America, England and India to show that diabetes is on the increase. The poorer strata of the society are not spared from this disease as evidenced by cases found in sweepers, agricultural labourers, carpenters, and other artisans. The richer classes have always been thought to be the victims of the disease. The admissions in the V S general hospital and in my private hospital confirm the view that the disease is far more common in the better classes. If the vocations are considered, it is found to be more common in brain workers of sedentary habits e.g. solicitors, pleaders, businessmen. Comparing the figures of the various predominantly vegetarian and non-vegetarian countries, one is impressed with the greater frequency in the former.

AGE —Diabetes is mostly a disease of later life. More than half the cases occur between 40 & 70. Under the age of forty the number of diabetics is small. Under twenty it is infinitely small. In our country

the disease is met with, a decade earlier. In children of both sexes the disease is not unknown. It is found at various ages e.g. 1, 6, 8, 12, 14 years.

SEX, —Statistics show that the disease is more in ascendance in females as compared with males in various countries of the world.

DISTRIBUTION —It is more common in urban areas due to over-indulgence in food and drinks, as compared with rural areas the proportion being about 60 to 40.

HEREDITY —The inheritance of the carbohydrate tolerance follows the Mendelian law. Those inheriting a high carbohydrate tolerance are non-diabetic, while those inheriting a low carbohydrate tolerance are born with a potentiality for the development of the disease. The family history of diabetes can often be traced in various families upto grand-parents. Joslin found this factor present in 20 p.c. of cases in U.S.A.

PREDISPOSING FACTORS —The chief constitutional predisposing factors in the production of diabetes are (1) Obesity. The longer the obesity continues the lower the sugar tolerance falls, and the greater the predisposition to diabetes. It is not the amount of overweight but the length of time it has existed that is important. (2) A strenuous nervous life is a great factor in its causation.

INFECTION —Infection as the cause of diabetes is definite. It is well known that infection aggravates diabetes. Septic tonsils and other focal sepsis play an important part in the causation of diabetes. The anatomical connection between the biliary tract and the pancreas is supposed to be responsible for the causation of diabetes by the infection of the pancreas from an infection of the biliary ducts via pan.

creatic duct The internal and external secretions of the pancreas are thereby affected, the former causing diabetes

The impairment of the function of the liver as regards glycogen metabolism, in cirrhosis, cancer and acute and chronic infections of the liver, will cause diabetes Joslin dissociates himself from the infection theory but thinks that mild chronic cases remain asymptomatic until the onset of an infection at which time the attention of both the patient and the physician is drawn to the diabetic condition by the loss of carbohydrate tolerance

VIEWS AS TO THE CAUSE OF DIABETES —The epoch making paper of Von Behring and Minkowski published in 1889 focussed attention on the pancreas as a possible cause of diabetes as they showed that the removal of the pancreas resulted in a condition which was practically the same as severe human diabetes Removal of a part of the pancreas may or may not produce glycosuria depending upon the part removed, but total extirpation produced severe glycosuria in all cases

It was further found that the loss of ordinary pancreatic acini was not responsible for the condition, but that the islets of Langerhans were responsible for the production of an internal secretion which is essential for normal carbohydrate and general metabolism This was further supported by the production of insulin by Banting and Best in 1922 the injection of which makes a diabetic curve normal.

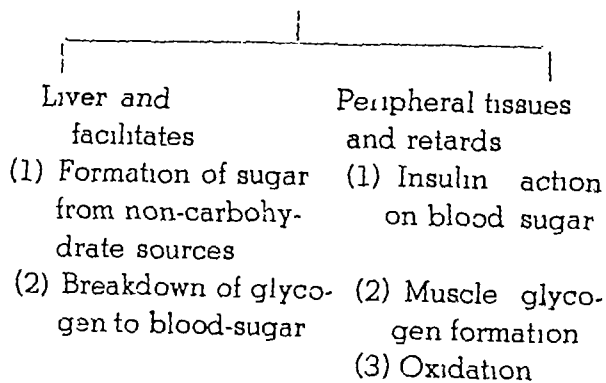
However, it is commonly known that all diabetic necropsis do not show either macro or microscopical lesions of the islets of Langerhans Partly for this reason and partly for the reason that deranged carbohydrate metabolism is found in other endocrinal dis-

orders it was thought that some other factor might also be responsible for the condition The liver has sometimes been thought to be partly responsible for the condition, but this is very unlikely in view of the rarity of glycosuria in severe liver damage. The true role of liver in carbohydrate metabolism is now much better understood and it is now accepted that the function of the liver is to store glycogen and liberate it subsequently as glucose when needed

The pituitary body now takes a place second in importance to the islets of Langerhans Housay has shown that previous removal of pituitary body prevents the appearance of diabetes when the pancreas is subsequently excised The administration of anterior pituitary extract will then produce glycosuria This observation has been definitely confirmed Attempts to obtain a diabetogenic principle from the anterior lobe of the pituitary have been partially successful The diabetogenic principle apparently consists of at least two separate hormones, one concerned with carbohydrate metabolism, the other with fat metabolism Recent work of Young, Himsworth and Scott has shown that there is glycotropic hormone in the anterior lobe of the pituitary body, which counteracts insulin by promoting rapid glycogenolysis and also by inhibiting the utilization of sugar by tissues

According to Himsworth —

Anterior pituitary acts on



Himsworth has correlated these actions with his clinical observations and he has come to the conclusion that there are two types of diabetics—The first group consists of the insulin sensitive patients who suffer from a deficiency of pancreatic function. They tolerate a high carbohydrate diet with the help of insulin. The other group does not tolerate the high carbohydrate diet even with insulin. These are probably of pituitary origin.

Other endocrine influences act on the blood sugar, thus Vasopressin, the secretion of the posterior lobe of the pituitary, is shown to be antagonistic to insulin, like adrenalin. Both these hormones appear to act on the liver in the opposite sense to insulin with regard to glycogen storage.

It is tempting to speculate whether hyperadrenalism may be a factor in the frequent association of glycosuria with high tension in the later middle life, for both these can be produced by excess of adrenalin.

In hyperthyroidism there is a lower sugar tolerance and consequent glycosuria. The thyroid by way of adrenalin mobilizes a large amount of glycogen from the liver reducing the storage capacity of this organ and of muscle tissue. Biologically this may be explained by the fact that in a hyperthyroid individual who is in a constant state of fright and potential flight there is an increased muscle activity (as evidenced by tremors and other useless movements). The adrenalin medulla being an organ for an emergency, keeps the muscles in a state of constant tension, which in turn necessitates the presence of large quantities of glucose in the blood and muscles to supply the needed energy. This constant over-mobilization of sugar eventually results in a derangement of other glands notably the islets of Langerhans, the pituitary, adrenals and the gonads.

Allen claims that prolonged rise of blood sugar is in itself sufficient to damage the cell islets. If this is correct it seems possible to explain the influence of diet in increasing the tendency to diabetes. The mortality due to diabetes during the great war both in England and Germany was considerably less, which rose again when the restrictions on diet were removed. An excessive carbohydrate diet requires more insulin to keep the blood sugar at its normal level and this in turn may exhaust the pancreas. This will probably explain the high incidence of diabetes in Indians.

T. C. Hunt has shown that alcohol lowers the blood sugar and Layton has suggested that this is due to the stimulation of the pancreas. Given an inherent weakness in the pancreas, its powers might thus easily be overtaxed.

It will be noted that the endocrine glands responsible for hyperglycemia are controlled by the sympathetic, while the production of insulin is controlled by the vagus.

Le Barre's experiments show that a rise of blood sugar in the cerebral circulation causes the vagus centre to stimulate the production of insulin by the pancreas just as a fall of blood pressure excites the vasomotor centre. It is clear, therefore, that anything which disturbs the balance of the autonomic nervous system in the direction of sympathetic overaction and parasympathetic underaction would tend to raise the blood sugar, this would explain the influence of nervous factors in the production of diabetes. The clinical equivalents of this process are seen in the glycosuria of concussion, cerebral tumours, cerebral haemorrhage, pineal cysts etc. But we must not forget that pressure on the pituitary body caused by the above conditions may be responsible for squeezing its secretion into the cerebrospinal fluid thus causing a

glycosuria. A mistake is liable to occur when a comatose patient is found to have sugar in the urine and where no clinical history is available. Under these circumstances the presence of diacetic acid in the urine is important.

In asphyxial conditions glycosuria may occur. This is probably the cause of post-anesthetic glycosuria. This may be due to stimulation of sympathetic nervous system.

In the older group of diabetics there is an association of arteriosclerosis so much so that it might reasonably be suggested that in older subjects local arteriosclerosis of the vessels of the pancreas may be the starting point of the disease. The slow end insidious onset of this type of diabetes corresponds with the gradual progress of arteriosclerosis.

It is also suggested that pregnancy and lactation often mark the onset of diabetes.

PATHOLOGY—As surgeons we are most concerned with those organs of the diabetic which require our preliminary attention before operative treatment e.g. heart—there may be infarcts, aneurysms of the ventricles, myocardial or coronary sclerosis. The vessels of the leg & hand often show sclerotic changes of the atheromatous rather than of the senile type, leading to gangrene of the toes and fingers. Chronic nephritis is also more common in the diabetic.

BLOOD CHEMISTRY—Glycosuria found in diabetes has tended to concentrate attention on this defect of carbohydrate metabolism. It cannot be too strongly emphasised that diabetes is a disease of general metabolism in which all the ordinary food stuffs are involved. The sugar in diabetic urine is chiefly derived from the starch taken as food but protein can also produce sugar, and in bad cases large amount of sugar may arise from protein as is revealed by an increased excretion of

nitrogenous substances in the urine. In severe diabetes, it is common enough to come across patients who pass large amounts of sugar when on carbohydrate-free protein diet. It is also frequently observed that increase in the proteins of the food results in increased production of acetone and diacetic acid. Fat does not give rise to sugar directly, but indirectly it may cause the appearance of sugar in diabetes especially when large amounts are taken. Fat is the most important source of the acetone bodies, for an increase of fat in the diabetic diet will frequently give rise to large amounts of these ketone bodies in the urine due to incomplete combustion on account of inefficient carbohydrate metabolism. When the fat is reduced the ketonuria gets less or may disappear altogether. Frequently it is easy enough to get rid of the glycosuria by giving large amount of fat with proteins instead of carbohydrate but here the resulting acidosis may be much worse than the glycosuria.

Normally the blood sugar in the fasting state is 90 to 100 mgms per 100 c.c. Joslin regards a blood sugar of 140 mgrms or over while fasting or of 170 mgrms or over after an ordinary meal as definitely abnormal. When hyperthyroidism is a complicating factor he raises the normal fasting value to 170 mgrms. Himsworth suggests that the height of the blood sugar level is the essential mechanism determining the rate of carbohydrate utilization.

Figures as high as 1400 mgms have been reported without coma but this is possible only when the acidosis is absent or very slight. Usually the acidosis is sufficiently marked to cause coma, when the blood sugar reaches 400 to 500 mgms.

The blood sugar value of arterial blood is a little higher than that of venous blood.

In normal individuals blood sugar is distributed evenly between the corpuscles and the plasma but in the diabetic the increased amount is concentrated almost wholly in the plasma. Ordinarily the sugar in the blood is higher than in the lymph, but in diabetes the sugar content of the lymph is higher than that in the blood, thus favouring the growth of microorganisms in the tissues.

With these preliminary remarks on the etiological factors of the disease I will now proceed to discuss infections in the diabetics.

INFECTION—It is commonly considered that the diabetic is susceptible to pyogenic infection. However from our daily experience we notice that in spite of numerous minute injuries e.g. punctures of injections, scratches etc., very little infection occurs in diabetes, which can be explained only by individual resistance to infection.

The majority of diabetics coming with infections such as carbuncles, cellulitis of the extremities, gangrene, suppuration around the anus etc., are people over forty, an age at which lesions of the heart, blood-vessels and kidneys are definitely established. Priscilla White quotes a case of diabetes starting at the age of 15 years who suffered from gangrene of the toe at 29 years. At 28 years he had marked calcification of the vessels of the leg as evidenced by the X-rays.

Clean aseptic surgical incisions are not ordinarily infected in diabetics e.g. strangulated hernia, more than in the normal. Even amputations heal up by first intention in an uncontrolled case of diabetes, provided the amputation is carried out well away from the site of infection and is not accidentally contaminated and provided that the vessels are healthy.

Furunculosis is found in juvenile diabetes. I have come across three cases suffering from furunculosis whose urine was found to contain sugar. Carbuncles and gangrene however are not common and I have not come across any such cases in juvenile and adolescent diabetes, though they are reported by some authorities.

On the other hand, one is impressed by individual susceptibility to infection even when he is not a diabetic. Recently I saw a case of a young healthy man of 35 of moderate size suffering from a carbuncle of the neck. When I first saw him he had only four boils pointing over an area of 1" x 1", with an area of 1/2 inch induration underneath. The condition went on increasing even under treatment till an area nearly 5" x 3" was involved with multiple openings preceded by furuncles of the skin. The urine was persistently free from sugar. The fasting blood sugar was 90 mgrms. Even amongst the public there is a belief that certain skins are prone to suppuration and the relatives are too anxious to inform you when you are undertaking an operation on such subjects.

AGE—After the discovery of insulin the longevity of the diabetic is definitely increased, consequently many more cases of infection are now coming under medical treatment. According to John B. Hunter of King's College Hospital, London, the admissions of diabetics to the Hospital in the years 1919 to 1923 were 68 as compared with the admissions in 1933 to 1937 which were 730, both medical and surgical. In the first period there were two cases of gangrene and in the second period 39 cases of gangrene were admitted.

There were 90 cases of pyogenic infection of the common types namely cellulitis of the extremities, suppuration around the anus, gangrene of the extremities and carbuncle, admitted in the surgical wards of

the V S general hospital In my private nursing home, I had 51 such cases admitted during the last 5 years The average age was about 50, the youngest being 26 years old, and the oldest 70 years

SEX —23 per cent of the cases were females

CAUSATION —Cases are seen all the year round, but about 70 per cent of the cases are seen during the months June to August. The reason for this seasonal increase is common to all types of infections in general e g appendicitis, mastoiditis, furunculosis etc The high humidity together with the heat, causing excessive perspiration, is mainly responsible for allowing the common pyogenic organisms to flourish on the skin, these gain access to the circulation by scratching, etc During this part of the year the people eat the ripe mango fruit to their heart's content This might be responsible for raising the blood sugar thus converting a latent diabetic into a true diabetic

The common organisms are the various strains of pyogenic cocci and the B Coli group,

TYPE OF INFECTION —The common types of infection met with are as follows —

in private patients as compared with 28 per cent in the hospital class The proportion of carbuncles is greater in the better classes probably due to the diabetes being more common among them The proportion of gangrene is far more in the hospital class because their extremities are more exposed to minor injuries and consequent infection, as a majority of these cases are of the infective type

TREATMENT —In June 1936 I had a case of carbuncle on the back in a diabetic The patient was a well known pleader of Ahmedabad aged 50 I made the crucial incision as usual and the wound was treated locally with magnesium sulphate compresses Insulin was injected After a period of about two months he succumbed to the disease as the carbuncle went on spreading in spite of all my attention and care The result was a great shock to me, as I did not expect such a result. I can also remember a case of cellulitis of the hand, in an old diabetic of about 55 years The cellulitis went on spreading as the incisions were made, which was at first confined to a finger Ultimately the patient died I remember another case with suppuration in the foot in a middle aged diabetic lady, which also went on spreading even after incisions She recovered after a period of about six months These

YEARS 1935-39

	Total admissions	Whitlows Cellulitis	Perianal suppuration	Gangrene	Carbuncle	Mastoid
V S General Hospital	90	18	6	25	40	1
Nursing Home	51	14	4	3	29	1

From the above tables it will be seen that there are 59 per cent of cases of carbuncle among the better classes as compared with 45 per cent in the hospital class of patients, and the proportion of gangrene is 6 per cent

and other similar cases set me thinking that something was definitely wrong with this method of treatment It is very discouraging to see the disease spreading day by day when all the recognised methods of surgical

treatment are followed most zealously. One cannot promise any definite good result. Even the public is scared by the lack of results, so that it resorts to all sorts of quack treatments. Nowadays, thanks to the many surgical journals, detailing the experience

over the results of my cases. However, I could not get the apparatus till July 1937. I have treated all the cases of infection in diabetes with Short wave therapy after this period with satisfactory results as is seen by the following table —

		Results		
		Cured	Relieved otherwise	Dead
Cases treated by ordinary surgery	90 + 9 = 99	59 + 5 = 64	14 + 2 = 16	17 + 2 = 19
Treated by S W Therapy	42	38	3	1

The + cases under heading ordinary surgery and all the short wave cases are from the Nursing Home

of surgeons all over the world, it is relatively easy to assess the risk of a certain surgical procedure with due regard to one's own experience and limitations. The patient wants to know the end-result and if one cannot reassure one's patient regarding the result, it is probable that the patient will not submit to one's treatment. This can not be done in diabetic infections with a clear conscience as one can not be sure about the arrest of the spread of the infection. Many operations which were dreaded before have now become simple as pathology is better known and the general principles of surgery are better understood. Fortunately, the bio-chemistry of diabetes is being understood more and more and the results of ordinary operations in a diabetic carry very little extra risk as compared to the normal individual. However, infections in a diabetic are still not easily controlled in spite of insulin, with the ordinary surgical methods of treatment.

In June of 1936 I came across an article by Morris Fellman in the American Journal of Surgery on the treatment of two cases of carbuncle with short waves, which arrested my attention, as I was in a despondent mood

Relieved otherwise means discharged in a bad condition i.e. dead after a day or two at home. Thus the real mortality will be 35.3 per cent in 99 cases treated by ordinary methods and 9.5 per cent in 40 cases treated by short wave therapy. In the four dead out of those treated by Short wave therapy one was an old man of 75 with 5 big carbuncles, treated only for a period of four days. One had big secondary glands in the abdomen due to a primary growth in the testicle, one with perianal suppuration was cured in the previous year, but came late the second time and expired. Thus though the mortality in those treated by Short wave therapy is apparently 9.5 per cent it comes to very little when the actual conditions are marked out.

Our series of cases treated by Short wave therapy consisted of cellulitis, gangrene, carbuncle, perianal suppuration and mastoid.

INTRODUCTION TO SHORT WAVES. — Since the first application of high frequency currents to therapeutic practice by D'Arsonval in 1892, the development of high frequency therapy has been closely asso-

ciated with that of high frequency and radio-engineering technique, and advances in the latter have been followed almost immediately by progress in their medical application

Short wave therapy is based upon the use of high frequency currents with frequencies of from 10 to 100 million cycles per second. An antenna fed with these currents emits electric waves varying from 3 to 30 meters in length.

It is not the waves themselves, propagated in space, which are used for therapeutic purposes but the Short wave high frequency currents are transmitted by capacity to and within the body of the patient. This produces immediately a definite heating effect.

It is not correct to consider Short wave therapy to be an improved form of diathermy. The biological and therapeutic effects of Short wave therapy are of a completely different character and hence it must be inferred that a second characteristic specific action must be occurring in addition to the thermal action. The most favourable results have been obtained with Short wave therapy in acute inflammatory purulent or septic processes. As a consequence Short wave therapy to day ranks first among electro physical healing methods.

PHYSICAL PRINCIPLES—The high frequency currents used in Short wave therapy are applied to the body with the aid of a short wave condenser electrode. In this way the electric field penetrates the body of the patient and acting on the ions and electrons in the body material brings them into synchronous oscillations i.e. produces currents of the same frequency within the body. Owing to the high frequency of these oscillations the currents produced give rise to no electrolytic or faradic effect but merely produce Joulean heat. Those organs which could not be heated sufficiently hitherto

owing to their being surrounded and screened by fat or bone masses, can now be penetrated and heated in the Short wave field.

BIOLOGICAL & THERAPEUTIC EFFECTS OF SHORT WAVES —

(1) Heat and hyperemia of the tissues immediately follow and become perceptible.

The hyperemia produced by the Short-wave is of longer duration than that produced by any other heat treatment method. Pflomm has found that this effect lasts for 48 hours after penetration thus proving that other physical principles are involved here than those concerned with only the production of hyperemia.

(2) Anodyne and soothing effect.—Alleviation of pain even by the first treatment is noticed. There is also a distinctly soothing and agreeable effect often amounting to a soporific effect. It has also an anti-inflammatory and antiphlogistic effect.

The more recent the inflammatory process is, the better is the reaction to Short wave treatment.

Schliephake also suggests that there is a certain amount of autovaccination due to the dead bacteria. While curing furuncles one finds that several untreated ones are healed simultaneously.

Schliephake has proved that in the Short wave field pus & inflamed tissues are heated to a higher degree than healthy tissues. Pflomm has found that the Short wave field gave rise to increased fluid changes between the capillaries, and the tissues. This has an influence on the disturbed osmotic processes and furthers healing.

Whether the influences of the Short wave field on the inflammatory diseases due to infection is indirect or direct, the important thing is the activation of the natural

prophylactic forces and the real diminution of the virulence of the bacteria which is beyond all doubt confirmed by all writers

HARMFUL REACTIONS — Sometimes perosteal, peritoneal and pleural pain occur when the treatment is being actually given but is of no consequence. Its occurrence suggests a reduction of the dose

Nervous secondary phenomena e.g. malaise, impaired sleep etc. have seldom been observed

Eyes are not affected by the Short wave field

TECHNIQUE — Certain broad principles for practical purposes will be outlined here

(1) The dimensions of the electrodes must always be as large as possible

(2) The electrodes should not be placed directly on the body, but should be arranged at a distance so as to have a homogeneous depth effect

(3) The electrode skin distance depends upon the depth effect desired. To have effect on the skin the minimum distance of the electrode from the skin should be 1 cm. If swelling is present the electrode distance must be increased accordingly

(4) Incisions of carbuncles and abscesses and wound areas should be avoided if possible, as interference of this kind greatly impairs the effect of Short wave therapy

(5) In treating wounds, the dressings, whether dry or wet or with ointment, should be removed, as these may cause additional heat effect and burns. Such cases are best treated over a bare skin with Schliephake's electrodes and a free air distance between them and the skin, which completely avoids contact with the wound or injured part. The indifferent electrode should be of the same size or larger than the active one

(6) A piece of metal lying between the electrode and the skin causes field concentration and is likely to cause local over-heating, therefore, metal parts of clothing, pins, hairpins, contents of pockets should be removed or kept out of the condenser field

DOSAGE AND TREATMENT TIME —

Dosage must depend to a large extent on the patient's subjective heat sensation, and is adjusted by voltage, size of electrodes and distance of the electrodes and above all by the result of previous experience. Even with a maximum dosage there should be no tingling or disagreeable sensation. The normal and suitable dose is just that amount of energy necessary to produce an agreeable warmth

Experience has shown however that the normal dosage applied to the patient in most cases does not come near reaching harmful dosage, so that generally speaking, determining dosage according to the subjective heat sensation method usually fulfills the requirements in practice

A difficulty may be experienced when the part is anesthetic. The machine is usually set for a normal protective range and if one keeps within the range, a burn is most unlikely to occur

The exposure time varies between 5 and 20 minutes depending upon the infective condition and the vascularity of the part. It may be used daily in the early stages but later on when the part is more vascular the time may be diminished and the interval lengthened, as otherwise the part tends to be boggy and healing is delayed

The number of exposures depends upon the stage at which the disease is noticed, the size of the lesion, the vascularity of the part, the resistance of the patient, etc. In our

series the average number of exposures was as follows —

	Cases	Average no of exposures
Carbuncle	23	18
Cellulitis	9	28
Perianal suppuration	4	12

Early cases when treated by Short wave therapy clear up without any surgical intervention. When the lesion is seen later or is extensive surgical intervention is required to let out the pus. Through this incision the slough also comes out later. A small incision is made over the fluctuating area with a tissue cutting electric knife which prevents further local and general spread of the infection.

TREATMENT OF GANGRENE—Short wave therapy is not very useful in cases of dry gangrene as the limb is not sufficiently vascular to respond. However, after the removal of the finger or toe, if the infection is spreading and in cases where there is lymphangitis, Short wave therapy helps to control the infection.

In cases of infective gangrene of fingers even when there is osteomyelitis of the phalanges, Short wave therapy has helped to preserve the finger though it may remain stiff. The tendon usually sloughs out and either nature makes an opening or if the part has become too boggy a small nick is made with the diathermy knife to allow the slough to come out. The healing then takes place rapidly. The Short wave exposures required are rather longer as the part is relatively avascular. In the case of the toes where their preservation is not so important removal is done, once the acute infection has settled down.

If the infection is acutely spreading there is no choice but to amputate well away from the site of infection, preferably in the

lower third of the thigh. If the infection is mild or is getting localized the amputation may be done safely in the lower part of the leg. The part is sufficiently vascular to allow healing by first intention.

All precautions are taken to preserve the vascularity of the flaps. The tourniquet is lightly applied over a pad of cotton wrapped in cloth to avoid unnecessary pressure on the artery. The circular method is used and flaps if used are not raised from the muscles. The muscles are cut at the level of the retracted skin. The bones are divided at the level of the retracted muscles.

In the removal of the fingers the tendons are cut flush with the skin as they are likely to retract and spread the infection.

Wolffe of Philadelphia claims that pancreatic extract (enzyme-free) injected 1 to 3 c c daily or on alternate days, together with other forms of treatment including Short wave therapy helps to stimulate repair rapidly in both types of gangrene. He contends that in the diabetic not only the carbohydrate metabolism but also the fat metabolism is disturbed, Insulin helps the carbohydrate metabolism, but the whole pancreatic extract (enzyme-free) is supposed to help the latter. I must thank Dr Wolffe for sending me samples of the extract he uses. I tried it on one case of infective gangrene of the second toe in a female in the V S hospital. I am consequently not able to express any opinion about the same. Further trial is necessary.

GENERAL MANAGEMENT — Acute infections in diabetes cause a sudden fall in the patient's carbohydrate tolerance. Owing to deficient oxidation of the carbohydrates by the body, the normal process of fat metabolism stops short at the stage of butyric acid from which aceto-acetic acid, B-hydroxybutyric acid and indirectly acetone

are formed. These ketone bodies accumulate in the blood and cause ketosis. When infection is present in a diabetic the process is exaggerated.

In the blood, ketone bodies cause a reduction in the fixed base and consequent dehydration and decrease in blood-volume as a result of the lowered total salt concentration of the body fluids. The carbon dioxide content of the alveolar air is reduced from 5 p.c. to 3 p.c. and the alkali reserve falls to 40 or 30 volumes of carbon dioxide per 100 cc. plasma.

The above facts should be borne in mind in treating diabetes when an acute infection is present.

DIET—This varies so much in different parts of our country that it is very difficult to have a standard diet particularly for vegetarians. If the patient is seen late, he usually comes in a semistarved condition, as starvation seems to be the common measure of controlling glycosuria. The patient is losing body weight by the loss of heat energy due to the rise of temperature and when accompanied by starvation his body resistance to infection is much lowered, quite apart from the fear of acidosis. Probably starvation is telling more upon his mind than the disease. As I have said before the difficulties of rationing the proper theoretical diet is difficult for strict vegetarians in our part of the country. I therefore, do not attempt to do the same, nor do I find any difficulty in the way I carry it out. I like to give plenty of green vegetables which include all possible types growing in our parts, including green cereals which supply a certain amount of protein, carbohydrates, chlorophyll and vitamins B & C. Milk is allowed freely. For those who do not like it, whey prepared from curds and cream from whole milk is given. Oranges are also allowed. Carbohydrates are restricted but are given in sufficient quantity with

butter to allow a feeling of fullness of the stomach. Bread either of millet or wheat is also permitted. The patient feels immediately grateful if he has been starved before. Wherever possible, it is desirable to calculate the diet on the basis of 2 parts of carbohydrates, one of protein and one part of fat. The total caloric value can be estimated by counting 35 calories per kiloweight. When it is not possible to make fine adjustments it is safe to give a milk diet. A quart of milk has a caloric value of 650 calories and contains approximately 45 grms. of carbohydrate, 30 grms. of protein and 30 grms. of fat. Given the patient's weight it is a simple problem to determine the amount of milk necessary to meet the caloric requirement. If the patient is obese and overweight the amount of the protein and fat should be decreased. In addition to the milk, extra carbohydrate may be arranged in the form of orange juice.

An abundant carbohydrate allowance in the pre-operative diet prepares the patient for the drainage of glycogen reserve which is apt to occur. Abundance of carbohydrate is needed to bring about complete combustion of fat. Roughly 1 gm. of carbohydrate is needed to burn 2.5 grms. of fat.

FLUIDS—Dehydration as a result of either operative procedure or acute infection is common. Acidosis is accelerated under these conditions. The patient should be urged to take at least 6 ozs. of water or orange juice every hour before operation. If the patient is unable to retain by mouth, a pint and a half of normal saline should be given subcutaneously. Intravenous injection of a large quantity of fluid should not be attempted. This means an added circulatory load in elderly diabetics in whom cardiac weakness is frequent. 5 p.c. glucose with 3 p.c. soda bicarb. in normal saline given per rectum by the drop method is also of value.

Adequate amount of alkali e g soda bicarb dram 2, every three hours will be of value

INSULIN —The dosage of insulin should be judged by frequent urine examination. Roughly one unit metabolizes 2 grms of glucose. Sometimes in the presence of infection insulin fails to act very favourably and hence the presence of sugar in the urine is no contraindication for operation. Not infrequently severe diabetes may show no sugar in the urine but may still have high blood sugar and a good amount of acetone in the urine. This is probably due to the raised threshold for sugar in damaged kidneys.

SELECTION OF ANAESTHETIC —Chloroform must never be used in diabetic surgery. With ether there is always a rise of postoperative blood sugar. This tendency to an increase of blood sugar is exaggerated in diabetes and constitutes one of the dangers of ether anaesthesia. The use of ether can result in the production of acidosis in non-diabetics, much more so in diabetics.

Nitrous oxide and oxygen is the safest for short operations.

Ethylene is used more frequently in diabetic surgery. Rise of blood sugar occurs with ethylene but can be controlled by adequate dosage of insulin. In diabetics protected with insulin there is little or no change in the CO₂ combining power of blood plasma. During the course of anaesthesia 20 cc, of 50 p c glucose with 2 units of insulin per gramme of glucose is given intravenously.

General anaesthesia should be administered by an expert in diabetic surgery and the smallest amount necessary to produce the desired result should be used.

Simple local anaesthesia is very satis-

factory. Spinal anaesthesia is satisfactory in selected cases.

CONCLUSION —

(1) A short resume of the history of diabetes is given.

(2) General management of a diabetic with infection is considered.

(3) Use of Short wave therapy is considered an advance over other older forms of surgical treatment.

I express my sense of gratitude to Dr J T Bhatt Assist R M O of the V. S hospital for his valuable assistance and Dr R P Parikh and Dr K S Jani for helping me collect the hospital statistics.

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A DISCUSSION FOLLOWED

Dr S R MOOLGAVKAR, F R C S, said that the one thing he emphasised strongly in cases of pyogenic infections in diabetes was the examination of the urine. As soon as the patient was admitted his urine is examined for percentage of sugar and for acetone. He does not very much worry about the sugar percentage excepting when it exceeds 3% but he does worry about the acetone. His standing instructions are, that whenever there is acetone, an immediate injection of forty units of insulin with two ounces of glucose by mouth be given. Soda Bicarb in half drachm doses 4 hourly is also started. The urine is examined every four hours and the insulin and glucose repeated till the urine is acetone-free, thereafter the dose of the insulin is adjusted to the requirements of the patient. If the acetone does not show diminution after the 2nd dose the dose of insulin is increased. He has given as much as 100 units at a time. The operation is undertaken after the first injection as he believes that the acidosis is promoted by the septic absorption.

Some years ago he used to use chloroform as an anaesthetic in these cases but he agrees with Mr Joshi that many cases can be operated on by local ethyl chloride spray constantly maintained. The over-lying skin in many carbuncles is half dead and almost insensitive. In the past 5-6 years he has used gas and oxygen only. He does not believe in using local infiltration anaesthesia in these septic cases as it may lead to the spread of the infection. He has however amputated under regional anaesthesia in very bad cases.

He had encountered carbuncles of two varieties. One was softish with massive yellowish white sloughs and thick pus exuding from round about the sloughs. The other was a cheesy variety, more firm and not exuding pus. The appearance of the cut

surface is granular, the granules being of a firm cheesy consistency and varying in size from a mustard seed to a pepper. There is no exuding pus. The cheesy variety is always the more dangerous.

In dealing with carbuncles he makes a large number of radiating incisions often as many as ten. These incisions are deepened and then each petal is taken up and undercut beyond the indurated margin. The incision must extend beyond the purulent infiltration. When the carbuncle overlies a dense fascia, as over the back of the neck, he always incises through the deep fascia into the muscles and it is surprising how often sloughs are exposed and quantities of pus let out. He thought this step as important in order to avoid repeated operations. He did not attempt to cut out sloughs excepting those that were very loose. Oozing was disregarded as it stopped very soon but spouters were under-run with catgut and tied. The first dressing consisted of gauze soaked in hydrogen peroxide. For the next few days a paste made with exsiccated mag sulph and glycerine mercurochrome 1-250 was packed into the wound. This was uncomfortable for the first half hour after application but helped to loosen the sloughs rapidly.

The most dangerous form of cellulitis in diabetes occurred in the hand and foot. The danger is due to the many planes present and to the tendons acting as guides. It is always best to make free and wide incisions. In the foot the plane along tendon of the flexor hallucis longus should be particularly watched and laid open freely as soon as any redness or a tenderness is manifest.

In such cases continuous irrigation according to the Carrel-Dakin plan is very useful. Care must be taken to see that the fluid

comes in contact with the septic cavities and that the fluid flows along all the tubes. Chlorogen half an ounce to a pint of water is used for the irrigation. The skin round about the wounds should be freely smeared with vaseline. An automatic flush is used instead of flushing out with syringefuls of the lotion. The flush can be adjusted to operate as often as required from 3 minutes to 1/2 hour. If the cellulitis spreads in spite of treatment amputation is the only recourse.

Amputation is also necessary in cases of diabetic gangrene.

He had tried ultra short wave therapy in some cases of diabetic cellulitis and carbuncle but he had not found it a success. Ultra short wave therapy was nothing but an induction of current which warmed up deeper structures by the resistance offered by the body to the induced currents. The shorter the wave the deeper and more rapid the penetration. He did not think that any good was done by either six meters, twelve meters or any other meters in these cases. He had found it useful in mild infection in non diabetics.

Dr KINI stated that he was interested in diabetic surgery as in the hospital where he worked a large number of diabetic cases were admitted with surgical complications. The questions that naturally arise are

- (i) What medical measures are to be undertaken in cases of surgical diabetes
- (ii) When should surgical interference be undertaken in surgical complications of diabetes
- (iii) What is the prognosis of these cases

It has been the experience that surgical complications of diabetes were admitted in a general hospital in a very grave condition after having tried all kinds of treatment

before admission. Primarily this grave condition is due to the failure on the part of the medical profession to do the first important examination as impressed by Dr Moolgavkar, viz, the examination of urine for sugar and acetone.

The treatment of carbuncle is a difficult problem and various methods have been advocated and the speaker had tried all of them with varied success. The most dangerous type of carbuncle is the one which is hard in the centre with spreading indurated edges and is most commonly found in fatty people. It has been his experience that carbuncles in thinner people respond to treatment better than in fatter people. He advocated that if incisional method of treatment is undertaken in carbuncles, the incisions should stop at the line of demarcation as a carbuncle is a gangrene of the subcutaneous tissues. It is always wise not to continue the incision beyond the line of demarcation which is a protective barrier.

Diabetic cellulitis is the most dangerous of all complications. The statement prepared by his house surgeon Dr Sunderramamurti and distributed shows the mortality rates in cases of cellulitis as well as in other conditions of surgical complications of diabetics.

Majority of the cases admitted to hospital with cellulitis were in a dangerous condition and the only life saving measure that could be adopted was amputation and this radical treatment was not without its danger as some proved fatal. In cases of cellulitis with infection by *Bacillus Welchii*, the prognosis becomes more grave.

Perforating ulcers in the foot are sometimes found in diabetic cases associated with neuritis and in these cases peri-arterial sympathectomy has given a satisfactory result as illustrated by the pictures shown on the screen.

The question of selection of anaesthetics in diabetics is really a serious problem. The employment of local anaesthesia in inflamed areas by infiltration is not wise. Local anaesthetic has a definite place in recent times and is excellent. If the patient is refractory field block is combined with nitrous oxide and oxygen. Ethyl chloride anaesthesia for short anaesthetics as in cases of carbuncles is very useful.

Type of infection	Average age in years	Number of cases	Part of body affected	Result				
				Cured	Relieved	D's otherwise	Died	
Cellulitis	51.2	31	Foot & toes	53%				
			Hand & forearm	17%				
			Leg	13%				
			Face & neck	10%	50%	10%	7%	33%
			Scrotum	3%				
			Back	4%				
Carbuncle	50.0	23	Back	63%				
			Neck	16%				
			Buttock	14%	52%	9%	13.5%	26%
			Thigh	4%				
			Face	3%				
Gangrene	53.1	10	Foot	62%				
			Leg	25%				
			Hand	8%	30%	20%	30%	20%
			Back	6%				
Abscess	48.3	6	Heel	33%				
			Forehead	33.3%	66.8%	16%		15.2%
			Thigh	33.3%				

undertaking surgical procedures in diabetic cases the speaker has used local anaesthesia in blocking the nerves well away from the seat of infection thus enabling him to do the operation without any pain. Spinal anaesthesia was practised by the author but it is not without its dangers as in cases of diabetes the fall of blood pressure is of grave significance.

Amputations of arms and legs could be done by field block, e.g., the upper limb could be removed by brachial block and the lower limb by blocking the femoral, the obturator, the sciatic and the external cutaneous nerve. This has been his practice

Some cases after recovering from carbuncles and gangrene died suddenly of uraemia. It is presumed that these also developed carbuncles of the kidney. There is no post-mortem evidence to confirm this speculation as in none of the cases that died with this complication could a post-mortem be obtained.

Dr R N COOPER said that before they could judge the results of various treatments and in order to give a reasonably correct prognosis it was necessary to have definite data regarding carbuncles.

He suggested that the following points should be noted,

Situation - e.g carbuncles on the face were more dangerous

Size a carbuncle over three inches in diameter was usually a serious affair

Number multiple carbuncles were always dangerous

Hardness The harder the carbuncle the worse the prognosis.

Color A dusky bluish red colour was usual but an angry bright red halo often spelt disaster

Progress a carbuncle progressing in size from day to day was a cause for much anxiety

Temperature & delirium { The higher the temperature and the greater the delirium the worse the outlook,

Blood culture a positive blood culture worsened the prognosis

Albumen, casts & acetone in urine { added to the gravity of the cases

A high blood urea indicated a failing kidney and added to the risk

Repeated white blood cell counts with special reference to the Schilling index were valuable from the point of view of prognosis.

Progressive anaemia should be met by repeated transfusions of blood

Regarding gangrene occurring in diabetics he had tried periarterial sympathectomy with uncertain results. He favoured a circular amputation, with suture of flaps and without drainage in order to obtain rapid healing in cases of diabetic gangrene.

Dr R H KARMAKAR, F R C S recounted a case of diabetic carbuncles, where the use of M and B 693 used as an adjunct to insulin therapy and controlled dieting gave a most satisfactory result. The drug was started on the 12th day after admission and proved almost a life saving measure at that stage.

The patient was a male person, aged about 45, an agricultural expert. He was unaware of being a diabetic. He was admitted in a toxic state with 105 temp. He presented two carbuncles, the one on the posterior triangle of the right side of the neck being of the so-called "malignant" type because it was 6" in vertical diameter extending down to 1" below the clavicle and upwards to nearly the occipital protuberance and presented an angry red appearance. The other carbuncle was on the right thigh smaller in dimensions. His urine was found to contain sugar, acetoacetic acid and acetone.

For the first 8 days he was put on insulin, the daily dose having been increased from 40 to 200 units, alkaline mixture and fat free controlled diet. The urine was examined for sugar, acetoacetic acid and acetone four hourly. He became acetoacetic acid free from 5th day onwards and the lower margin of the neck carbuncle receded. Yet he continued to be toxic and pyretic, the range of fever being from 99° to 102°. The carbuncles were incised under local novocaine 1%, crucially and dressed twice a day with mag sulph in glycerine and chloramine alternately.

From the 8th to 12th day matters did not improve in spite of the operation. On the other hand the temperature range increased.

On the 12th day M & B 693 was started and continued for 10 days. The dose was 1 gm on the 1st day, 3 gms daily for 3 days and less subsequently, in all 20gms were given. The result was marvellous. Within 48 hours the temperature dropped down to 99° and never rose up again, the cheesy pus cleared out, the wounds granulated and bled on slight touch and the urine became acetone free.

From the 22nd day onwards the patient made an uneventful recovery.

Lieut Col V MAHADEVAN, I.M.S., F.R.C.S.F.R.C.P. disagreed with the previous speakers and said that a surgical operation like excision should not be done in all cases of carbuncles. He said that in this presidency they used to excise a carbuncle and sometimes if they could not do it they used to make plenty of incisions. But in the majority of cases it was found that the very next day the beds were empty. They in Madras, wanted to find another method by means of which they could get a live patient.

As regards the prognosis of carbuncles which were soft and those which were hard, Col Mahadevan said that all knew that all carbuncles were to start with hard and became soft because of the treatment and nature's method of liquifying the hard infiltration. Those cases being on the way to recovery have a better prognosis and their problem was how to convert a hard type into a soft one. With this in view he took the line of 'conservative treatment'. He injects whole blood all round the carbuncle. Some used to inject pure carbolic acid not in great amounts but 4 to 6 min round the carbuncles and apply hot saline fomentations every two or three hours, day and night. With this treatment, himself and two of his colleagues got far better results than with incisions and excisions. The surgeon's knife, with the infliction of the trauma will be producing a far bigger carbuncle later on.

The next thing, he said, was one which everybody knew but none had talked about. In diabetes there was a lot of water being eliminated from the body. Huge jugs of water were placed near the patient and the patients drank it continually as much as they could. Local treatment consists of glycerine mag sulph compresses.

With this treatment, he was sure the beds would continue to be occupied by patients.

Talking of gangrene in the extremities a certain amount of conservatism initially is advisable, for a few days, (at least two), fluid in large amounts is administered to combat dehydration, and glucose controlled with insulin to combat the faulty metabolism. This puts the patient in a better position to stand the shock of the amputation. The operation should be performed as quickly as possible.

Dr K MANJUNATH RAI, F.R.C.S., E said that he quite agreed with Dr Patel about the use of short wave therapy but advocated the use of X-ray therapy together with short wave therapy. Treated by this method, cases brought within 48 hours of the start, could be definitely aborted, in a large majority of cases. If these cases are brought much later, it was noticed that the cheesy material has got liquified and all that was necessary was only a skin incision as in an ordinary boil or abscess to let out the liquified pus.

Dr. Rai proceeded that the theory about this method of treatment is as follows —

According to the scale of radiosensitivity in normal cells the lymphoid cells and the polymorphs occupy a very high place. Therefore if you give a small dose of X-rays, these are bound to destroy a certain number of the white blood cells, thus liberating into the local circulation a certain amount of the antibodies and agglutinins which are the natural barriers against the spread of infection and are also curative. Further it is a well known fact that certain organisms thrive at particular pH of the media and if we change this pH it is found to influence their growth adversely, viz, the treatment of B. coli infections of the urine by alternately changing

the P. h of the urine I believe this should work equally well in these acute infections. Due to the action of X-rays certain of these cells are destroyed resulting in certain chemical bodies due to protein destruction being thrown into the circulation locally thus altering the P. h of the media in which these organisms have been thriving.

I advocate small doses of X-ray exposure 75r to 100r daily for four five days in an average case, combined with short wave therapy every day till complete resolution takes place. The short wave therapy should precede the X-ray therapy on the days X-ray treatments are given. In an average case about 15 to 20 short wave therapy sittings are necessary for a cure. The skin incision could be made at any time during the treatment.

Dr RAMA RAU also strongly advocated the use of short-wave therapy for acute infections. The real effect of short wave therapy in acute infection was from the non-thermal hyperaemia caused. Short wave apparatus gave wave lengths of 6-12 metres, and the electro-magnetic induction was 1824 metres or more, while the ordinary diathermy apparatus which they used in the treatment of chronic arthritic affections, etc, more than 32 metres. As the wave length increased the heat produced was greater, and as the wave length became shorter the proportionate heat produced was less. In acute infection, there was already a lot of heat in the tissues, but not necessarily hyperaemia. So in acute infection if the longer short waves were used, the excess of heat would produce increased congestion and thereby cause damage to the tissues. This was not a desirable effect. He would suggest the use of the ultra-short waves of 6 metres or less instead of the longer ones. The voltage to be used also had to be considered. If one was treating a thick part of the human body, one must

use greater voltage. But if one were treating the limbs (which are the thinner part of the body) one would use less voltage.

With regard to auto-vaccination effect and destruction of bacteria by short waves, Schleiphake had made some test tube experiments with bacterial culture media. Bacteria were found to be destroyed in "Vitro" and he said that there would be the same effect in the living. But his conclusions were disputed by several workers all over the world. As a matter of fact, the effect of short waves is to produce prolonged hyperaemia in the infected tissues, and so long as it is relatively non-thermal, one got the desired physiological reaction to repair the infection or the damage that was done. But when pus was loculated, it must be let out before ultra-short waves are administered. (As an illustration he cited the case of a child with and extensive osteomyelitis of the tibia which was saved an amputation of the leg by the use of ultra-short waves, after a conservative operation. The child is quite hale and hearty now for over three years.)

As a matter of fact, ultra-short waves are not responsible for the "auto-vaccination" effect, on the other hand X-rays are. X-rays destroyed the leucocyte cell wall and let the anti-bodies free locally in the infected tissues. X-rays were given in small doses of 50 to 100r. They gave X-rays once in four days and in the interval gave the patient ultra-short waves, the duration of ultra-short wave treatment was between 10 and 20 minutes depending on the thickness of the limb. Usually more than 10 treatments were not given.

Dr, Rama Rau pointed out that they should not submit human tissues to the treatment continuously without watching the effect they have on the infected tissues. He again stressed that ultra-short waves would help to relieve the condition much quicker.

than any other waves, and hastened post-operative healing. In very early cases small doses of X-rays and ultra-short wave checked the infective process and the lesion invariably cleared up. X-rays should not be given daily as was suggested nor ultra-short wave continuously for three or four weeks.

Dr C P V, MENON gave some statistics of cases of diabetic carbuncles treated in Col Pandalai's private hospital. 57 cases of single carbuncles were treated and 6 died. In 9 cases other carbuncles developed during treatment and had to be subsequently operated on, sometimes more than once. Of these 3 died. There were 11 cases where multiple carbuncles were present on admission and all were operated on in one stage. Of these 7 died. These are the worst type of cases. The routine treatment adopted was as follows—Every case of carbuncle in a diabetic is treated as a surgical emergency and operated on immediately after the usual examination of urine, blood pressure etc. They are given large doses of insulin and intravenous injections of glucose. The operation done is excision. A crucial incision is made. The limbs of the cross extending well beyond the area of palpable induration. The four flaps marked out are rapidly raised and the whole carbuncle cut out keeping well outside the carbuncle and cutting through healthy tissues. The free bleeding that occurs is controlled by haemostats and by pressure. The larger vessels are ligatured. In a patient who is very ill the haemostats may be left incorporated in the dressings and removed a few hours later. Following such an operation, the temperature comes down and the acetoneuria rapidly disappears with insulin and glucose. The wound takes a long time to heal. During convalescence the glycosuria is also brought under control and often at the time of discharge the urine is sugar-free with little or no insulin. The results are satisfactory and

the mortality though, high compares favourably with other methods.

Recently he had tried the Occlusive method recommended by the late Sir David Wilkie in non-diabetic carbuncles. The carbuncle is covered with sterile gauze, with no antiseptics and strips of elastic adhesive plaster are applied over it to cover a wide area. This left on for about a week and is removed only when it will no longer stay on or when the smell becomes intolerable. *Staphylococcus anti-serum* is administered during this period. It is found that the carbuncle has liquified and has partly discharged itself. The process is repeated, the dressing being changed once a week. Sometimes the whole carbuncle comes away in the dressings leaving a clean granulating area. The scarring ultimately left is minimum. Results in non-diabetic carbuncles have been uniformly good. He showed a photograph of an old lady of 58 with a large carbuncle on the back of the neck treated by this method and drew attention to the very small scar.

He has tried this method so far only in one case of diabetic carbuncle. This was in an old man of 60 with a huge carbuncle on the back of the neck, extending from one sterno-mastoid to the other and from the occiput to about the 2nd dorsal vertebra. The patient did well for a time and though the local condition was very satisfactory the carbuncle becoming localised and ultimately liquifying, the patient developed pyaemia and died. He attributed this complication to what he now thinks was an injudicious incision that was made after removing the first plaster.

Considering the satisfactory results of this occlusive treatment he was now in a position of being undecided as to what to do when faced with a diabetic carbuncle, which extends visibly day by day. Excision has given good results though, it is not ideal as

the mortality is still high, particularly when the original carbuncle extends or when new carbuncles spring up. Greater experience with the occlusive method was necessary before all carbuncles, diabetic and non-diabetic, would be treated by this method. At present he believes that they should either be left rigidly alone or cut out completely. Incisions alone have no place in the treatment.

He then quoted a few figures relating to the mortality of cellulitis and gangrene of the extremities. He believed that radical treatment by amputation should not be delayed too long when indicated. The difficulty was to get patients to consent to part with a limb even to save their lives.

Dr N S NARASIMHAN, F R C S said "The routine described by Mr Moolgavkar and Mr Cooper is eminently practical and is adopted in Madras as well.

As has been pointed out by Mr Patel there are a large number of cases of severe diabetes with a fasting blood sugar of 400 to 500 mgrms showing no sugar in the urine but a good amount of acetone in the urine.

Ischio rectal gangrenous cellulitis is a dangerous condition and spreads rapidly. Temporising measures must not be tried. For the past few years, it has been recognised that the infective condition must be treated on conservative lines. This means the fundamental principle of adequate rest to the inflamed part by splints, elevation, repeated glycerine sodium sulphas fomentations in addition to the general treatment of diabetes. By these measures small carbuncles and boils get well, the central slough comes off by itself. That certain cases do get well by the method is realised by everybody.

Short wave therapy cannot be adopted as a routine in every case. If the acetone

persists in urine it is a clear indication that there is pus which has to be let out. Acetone will not clear up unless sepsis is eradicated. There is no use for temporising measures in cases of cellulitis, early incisions will save a great deal.

After incisions it is better to splint and use dry dressings with glycerine sodium sulphas. Foot baths are not satisfactory because the essential pathology being thrombosis of the vessels it is better that the limb be kept dry. There is in addition the danger of secondary infection.

Local anaesthetics like 1% novocaine can be injected into healthy tissues surrounding and I have used them often, once a pyaemia was precipitated,

Nerve blocks are successful and operations on fingers and toes are done under regional local anaesthesia. Chloroform must be avoided in this hospital nitrous oxide and oxygen is used as a routine. In private work novocaine local or open ether are used.

Auto haemo therapy is successful, injection is done through the healthy tissues and a separate needle is used for such puncture.

Temperature keeps up for a week. A small incision is required to let out the pus and remove the large central slough.

The difficulty in any case is to decide what method to adopt. Carbuncles which have not well defined borders and which tend steadily to increase require excision. The surrounding red, thickened and oedematous zone indicates the advancing infection, even when the general symptoms are not alarming.

Infection travels along the columnar adiposiac and spreads laterally along the blood and lymph vessels.

The incision must extend down to the deep fascia, must extend widely beyond the

border of carbuncle proper and must drain the surrounding zone of advancing infection

The outside skin has to be protected by thick zinc oxide ointment or ung. hydrargyri ammoniata. No force is to be used to squeeze out pus. Spread of infection may result from squeezing or force.

Pyæmia is more likely to occur if the operator is over cautious and stirs up the centre of the carbuncle.

Auto-inoculation takes place at the periphery and prolongs the course of the disease, this may be complicated by septic phlebitis, embolism, septicaemia and pyæmia. There are cases where erysipelatous inflammations are met with during recovery.

Pyæmia is common and is seen in about 10% of cases here. There is a seasonal incidence during summer and in the rains, the perspiration producing a sodden condition of the skin.

Pyuria during convalescence is met with due to the excretion of organisms. Perinephric abscess and a carbuncle of the kidney may be met with but these two conditions do not produce pyuria.

A study of infections of the foot amongst the barefooted people is as important as infections of the hand. Incisions must be avoided on the plantar aspect of the foot. Incisions on the medial and lateral aspect of the foot will drain the muscle planes and spaces.

Dr R MADHADEVAN Vizagapatam, said "I want to stress on two important points in the general management of diabetic patients with carbuncles or other infections.

I have seen a fairly large number of these patients brought into hospital with evidence of great toxic absorption such as dry tongue etc, after a few days of treatment

outside. The reason is that it has not yet been sufficiently realised by many that it is not wise to restrict and regulate the diet in these patients with a view to reduce the sugar in the urine and then only give any necessary insulin for the residual sugar. These patients have to combat a very severe infection and to keep up their powers of resistance. It is important to allow them a liberal diet. As often as not, these patients know by experience what to and what not to take, and it is a very wise policy to allow them to take what they relish and as dictated by their appetite. Give them this liberal diet, and at the same time give the necessary insulin. Thus treated, they show a marked improvement in their general condition even in less than 24 hours. Ketone bodies soon disappear from the urine, though sugar may persist.

Regarding the administration of insulin—It is better to give smaller doses of insulin at frequent intervals, rather than bigger doses at longer intervals. Thus, it is better to give 20 units of insulin every 6 hours than 40 units every 12 hours. This keeps the blood sugar level under control more uniformly. It has been found that if an injection of insulin is given say at 6 P. M. the blood sugar level at 12 midnight shoots up and this is not controlled if the next injection is to be next morning only. Repeated small injections frequently bring the urine sugar down. In some cases if it persists, it can be further controlled by combination with, zinc insulin, by giving zinc insulin injections in the morning and ordinary insulin injections later.

Now, coming to the local treatment of carbuncles I must say that I have tried auto haemo therapy in a fair number of cases. In the non-diabetic carbuncles, I have seen it work like a charm in a good proportion. But in diabetic cases, some

respond and some do not and there is no knowing beforehand which case will respond. In the favourable case, small ones may completely resolve, but the bigger ones usually form a softened area in the centre. On incising this, a slough escapes and thereafter, the condition rapidly heals. Thus treated, the convalescent period is very much shorter than when excision or crucial incisions have been performed. A case that responds to auto-haemo therapy shows it within 3 to 4 days. If not, more radical measures have to be resorted to.

As regards local applications, it is better to use sodium sulphate in preference to mag sulph. The use of sodium sulphate solution is less painful. 12½% of the sodium sulphate solution with 5 ounces of glycerine to a pint of the solution is the one that I use.

Blood transfusion has a useful field in some of these resistant cases. I have used them in 4 or 5 of these cases. I know of a case where an amputation was performed at the middle of the thigh for a diabetic cellulitis of the foot. The flap became septic, the general condition of the patient was very low, but after blood transfusion, the wound rapidly healed up. Some of these cases show evidence of a chronic pyaemia and secondary anaemia. I think with step-ladder blood transfusions and iron by mouth these patients will derive great benefit. It is not uncommon to hear of some of these patients who a month or so after recovery suddenly die. This is due to toxic myocarditis.

As regards anaesthesia, I have used sodium evipan in some cases, but as a rule I use nitrous oxide and oxygen. If I may look into the future, I think cyclo-propane will take the field in five years' time. The great advantage of cyclo-propane is that it can be given as

85% of oxygen and 15% of cyclo-propane, whereas with nitrous oxide, the oxygen proportion can be kept at only 15%.

Dr E. S. GOPALAN, M.S. said "One or two points I wish to say as regards the conservative treatment which our President and I had adopted with success especially with reference to small carbuncles diabetic or non-diabetic. I advocate the old and tried method of cupping. This method is useful even in satellite carbuncles.

Another point is the method of crucial incisions, the elevation of the flaps and packing under the flaps without excising the slough. I tried this method deliberately in some cases and the results are good. This method is certainly worth trying if the patient cannot stand prolonged anaesthesia.

As regards treatment, in acute cases of carbuncle the ordinary insulin is better. When the patient is on the road to recovery the zinc protamine insulin can be used.

In reply to the discussion which followed his paper Dr Patel expressed great satisfaction that the subject was well discussed and such keen interest was taken.

In reply to Dr. Joshie, Dr. Patel agreed that excision was giving good results in selected areas, but carbuncle in certain areas e.g. face, back of the neck were unsuitable for excision and short wave therapy offered them the best way of treatment. Besides healing was greatly delayed after excision of a wide area. Regarding the pressure by the tourniquet, he said he had already suggested in his paper the use of a cotton pad over the artery while applying the tourniquet. Not only that but he had laid stress that flaps should be avoided while planning an amputation and the circular method should be used. The flaps when raised are likely to suffer from damage to their blood supply.

For opening pyaemic abscesses he uses tissue-cutting electric knife which in his opinion prevents further infection and new formation of abscesses. Regarding chloroform anaesthesia, Dr Patel said he could not think of using the same, knowing the bio chemistry of diabetes

In reply to Dr Moolgavkar, Dr Patel said that he preferred local anaesthesia in selected cases by infiltrating the solution in the surrounding healthy tissues. He also uses local anaesthesia in the line of the incision in cases of abscesses without any untoward effect. By incising and undermining the edges he thought there was a severe reaction and the area of inflammation increased next day and he was not satisfied with this procedure, he had been using the same in his early days. Under shortwave therapy early cases clear up completely without any incision, and in late cases localization occurs, when a small nick over the fluctuating area with a tissue cutting electric knife allows the pus and sloughs to come out. Dr Patel agreed that sulfanilamide was very helpful. He agreed with Dr Moolgavkar that the cellulitis of the foot and hand was very troublesome. Dr. Patel said that short wave therapy was also helpful in such cases to localize the disease.

Dr Patel agreed with Dr Kini that when B. Welchii and other gas forming organisms were the causative factor, the gangrene in the diabetic was far more serious and spread very quickly. He quoted a case

He agreed with Dr Cooper's classification of innocent and malignant carbuncles. Dr Cooper's suggestion regarding blood urea was also valuable.

Dr Patel said that the classification suggested by Dr Cooper was useful and he said that a case which he

had quoted in his paper could be grouped as malignant even though the urine was persistently free from sugar and the blood had normal sugar. Even with short wave therapy, these cases take much more time to heal up.

Col. Mahadevan was complimented by Dr Patel for his frankness in admitting the high mortality after various operative procedures in carbuncle. He uses auto-blood injections in the periphery of the carbuncle and also the injection of carbolic acid of which Dr Patel said he had no experience.

Dr Rai thought that the deep X-ray with short wave therapy gave good results. Dr Patel replied that he had no experience of deep X-ray therapy.

Dr Ram Rau thought that autovaccination effect of short wave therapy was not proved and that mere hyperemia was produced. Dr. Patel replied that if one boil was treated by short wave therapy others did disappear and this was thought to be due to autovaccine effect. Shortwave therapy, no doubt, acted by producing hyperaemia but it was not a surface hyperaemia, but a dilatation of the capillaries occurred at the desired spot and lasted much longer.

In reply to Dr Menon, who suggested that rest by strapping would help, Dr Patel stated that as in acute osteomyelitis rest by putting the affected part into plaster of Paris including two joints, one above and one below the lesion, gave very good results, so he thought rest should help. At any rate there is no hurry for incision. He complimented Dr Menon for the good results he got after operation.

In reply to Dr Narsinhani that ischio-rectal suppuration was very troublesome Dr Patel replied that short wave therapy in this particular type of infection was very

helpful and the infection cleared up very quickly

Dr Gopalan suggested that cupping of small carbuncles gave good results. Injections of zinc-protamin insulin was suggested but Dr Patel replied that one could not definitely tell when its effects would be felt and he quoted a case wherein it produced with twenty units hypoglycaemia four times within twenty hours, whereas the patient was receiving 80 units of ordinary insulin twice daily before, without ill effects

Dr Patel agreed with Dr Mahadevan in giving a liberal diet to the diabetic when suffering from pyogenic infection

The President Col Pandalal, I M S when winding up the debate observed as follows —

We have had an instructive discussion on one of the common causes of deaths in India. The condition is seen in all the provinces of India and considering that so many people die of it annually we should welcome new ideas which will improve our knowledge and treatment of the disease. I, therefore, listened most attentively to Dr Patel's paper. Dr Patel was originally a surgeon but has now adopted a physician's attitude, due as he admits to his bad results by surgical treatment. There are, however, other surgeons who have had a similar unhappy experience in certain cases, who have seen valuable lives lost in spite of treatment but their attitude sobered by experience continues to be still surgical. I have lost some cases too, but we must not forget that these people are to begin with abnormal. A diabetic is an abnormal man and pyogenic infection occurring in such a person is a calamity just as acute inflammation of the appendix inside an abdomen is a calamity. I operate on carbuncles immediately I see them as diabe-

tics have very little stamina and there is no reason whatever for delaying surgical relief. If my reasoning is right then it follows that the moment a case is brought to you with a carbuncle immediate operation is a necessity. Examine his urine for sugar, occasionally there is no sugar and nothing abnormal in the urine but albumin may be present in the urine. Cases with albumin in the urine are in a more dangerous state than those with sugar in the urine,

When dealing with carbuncles associated with sugar in the urine and ketone bodies, we should have always a ready plan of action. Otherwise we may not act rightly. My procedure varies according as the carbuncle is in an early or advanced stage. Any carbuncle which is roughly 3 inches in diameter or more is an advanced case. A carbuncle 3 inches in diameter irrespective of where it may be, back of the neck, the sole of the foot or the abdominal wall, the treatment is the same. If it is smaller, then perhaps conservative methods might be given a chance. Most of them dislike operation and if the carbuncle is small then you may temporise by treating with glucose and insulin to remove his sugar and ketone bodies and relieve pain by fomentation or antiphlogistine. You may try cupping x-rays short wave etc. Carbuncles sometimes disappear readily under this treatment especially those with no sugar or albumin or you may try the occlusive method. But when you are face to face with a real diabetic carbuncle in an advanced stage, it is a waste of time to be conservative. I never hesitate in these cases and do not feel happy until I get that carbuncle out. To be effective, surgery should be radical in these cases. What I mean by proper surgical treatment in these cases is firstly to make a crucial incision not only over the apparent sloughing area, but into the limits of the area of induration and

just beyond into healthy tissues. Having made these incisions raise the 4 flaps thus marked out by undercutting till you get well outside the carbuncle. The operation should be done quickly and a trained assistant is an asset.

Since these patients will not stand a prolonged operation the next step, i.e. excising the carbuncle should not take more than about two minutes. Therein lies the success of the measure. While you are cutting, the assistant clamps the bleeding vessels. The incision should be in healthy tissues and should not go through the sloughing area. If from the extent of bleeding you find that the operation is likely to take a long time or if the patient is not standing it well, you may leave the clamps on and put on a bulky dressing and send the patient back to bed. Intravenous saline or rectal glucose saline is useful to replace the fluid lost. If the operation is done in this way most patients stand it well and do not die. It must be admitted that some of the largest carbuncles we see, surrounding the neck or involving large areas of the back are not suitable for this method but even in such, the same method may be possible if adopted in stages, associated with general treatment designed to maintain the patient's strength. But such cases are a problem to surgeons and account for most of the mortality of carbuncles.

When a case of average-sized carbuncle dies, in spite of the above treatment he dies generally of complications. The first important

complication is extension of the process at the edge of the wound of excision. It must be remembered that these patients have a poisoned heart with very little tone in it. They may, therefore, die even during normal convalescence. Unexpected deaths of carbuncle cases are of this kind due to excessive strain on a poor heart which fails in consequence. These patients may also suffer from congestion of the lungs or may develop pneumonia during convalescence which no one can prevent. Secondly, they may develop other carbuncles in different parts of the body. If they do the treatment is the same. Lastly, a serious complication of these cases is pyaemia, we do not know why some cases lapse into this state, when they do, the outlook is dark but not always fatal. In pyaemia, do not be in a hurry to operate or make larger openings, merely puncture the collections of pus and evacuate the pus and sloughs. A great many such abscesses may form and the patient's only chance lies in slowly building up his defences, and not merely in surgical drainage, so that in these I make a small incision and evacuate the abscess contents. It may fill up again and when this happens you just put in a pair of sinus forceps and let out the contents, which you will find are more liquid and less purulent the next time.

Regarding blood transfusion we all know what a useful step it generally is in these patients. But it must be remembered that in certain cases with toxic flabby hearts, it may be the direct cause of death, so let us be careful and advise transfusion very cautiously.

PRESACRAL SYMPATHECTOMY FOR THE RELIEF OF DYSMENORRHOEA AND ALLIED PAINFUL CONDITIONS

By Lieut Col W C Spackman, F R C S E, F R C O G, I M S,
Professor of Midwifery & Gynaecology, Grant Medical College, Bombay

The operation of division of the superior hypogastric plexus, variously known as pre-sacral sympathectomy or Cotte's operation is now by no means new but it appears to be still but little appreciated and is practised by but few operators. Apart from spasmodic dysmenorrhoea, its indications are still somewhat vague and its results regarded as of doubtful benefit. No series has I think been published in India.

In the present article the writer proposes to review 100 cases of pelvic sympathectomy operated on by himself and his colleagues in Bombay during the last 7 years. I have to thank my colleagues for their kind permission to include 16 cases operated on by them as follows: Dr V N Shirodkar M D, F R C S (Eng) (6 cases) and Capt. R DeSoldenhoff, I M S, (10 cases).

The principal indication is dysmenorrhoea, more specifically primary or spasmodic dysmenorrhoea which is acknowledged by all as the outstanding justification for the operation and in the relief of which it undoubtedly gives such excellent results.

It appears to the writer that in India our hospital patients look for quick cures and if we try procedures that fail to relieve their pain they go and patronise the witch doctor or his equivalent round the corner. When therefore we get a condition where we know we can give maximum relief by any given treatment it behoves us to go straight to that treatment even if it is of a somewhat radical kind, rather than carry out milder methods which fail as often as not to give complete relief.

It is for this reason that the present series represents a somewhat large number of cases compared to other published series.

Lest we should be regarded as being too drastic in our treatment, I may point out that there are frequently cases suffering from appendicitis or other conditions where it is highly desirable to open the abdomen. If such patients are also afflicted with severe dysmenorrhoea, the addition of a sympathectomy adds a mere ten minutes to the operation time and scarcely increases its severity at all. Similarly if they have a retroversion, sympathectomy can be combined with a ventri-suspension.

Many excellent articles have been written on dysmenorrhoea, giving advice on hygiene and exercise for its relief, and no doubt such advice if conscientiously followed will at least enable the patient to bear her pain more readily, but the number so cured is, I suspect, less than 1%. Drug treatment is almost as disappointing, and dilatation whilst giving relief to a majority for at least one period rarely produces an effect of a permanent character. Where the natural cure of marriage followed by pregnancy can be shortly expected, such lines of treatment are suitable. They give some support and encouragement to the patient which enable her to bear with patience her painful periods for a few months.

The presacral nerve or superior hypogastric plexus is composed of both sensory and motor fibres of the sympathetic and parasympathetic system. The sensory fibres carry sensory impulses from the pelvic viscera especially from the uterus, rectum and bladder whilst the motor fibres control

vasoconstriction and sphincteric tone of these organs. Hence if dysmenorrhoea is due to angiospasm or to irregular muscular action it should be relieved by interruption of this nerve channel, and consideration of the nerve fibres also explains why bladder pain and spasmodic dysuria are equally relieved,

As a matter of fact there are five possible explanations why division of the nerve plexus may relieve dysmenorrhoea

- 1 It is the principal sensory nerve channel from the uterus
- 2 It may be the subject of an actual neuritis
- 3 Its division may alter the tonus of the uterine musculature
- 4 Its division may suppress an abnormal reflex uterine muscular spasm
- 5 Its division may prevent an angiospasm effecting the uterine vessels

The plexus is formed at the level of the bifurcation of the aorta from fibres descending along the aorta together with numerous others joining from the lumbar ganglia. Over the promontory of the sacrum it forms more or less of a flat band which soon splits into two halves which proceed deeply towards the lower sacral vertebrae (in the female deep in the direction of the sacral ends of the utero sacral ligaments) behind the posterior parietal peritoneum. Throughout its course the plexus is joined from each side by very numerous fine nerve fibres some of which appear from under the common iliac arteries. In addition, at its higher level it exchanges many fibres (a) with those in the pelvic meso-colon where they are seen in close company with the inferior mesenteric vessels and (b) with the sympathetic neurones accompanying the ureters

INDICATIONS FOR ITS EXCISION

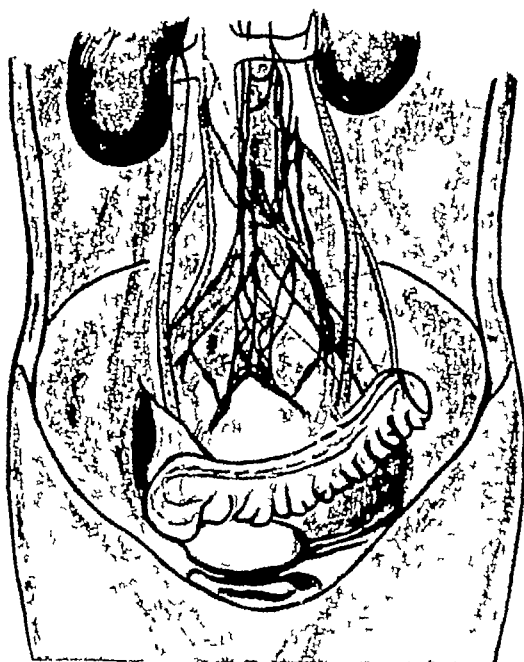
- 1 Spasmodic dysmenorrhoea
- 2 Pelvic neuralgia due to malignant disease of the uterus, bladder or rectum
- 3 Pelvic neuralgia and dysmenorrhoea due to chronic inflammation especially if this incarcerates the ovary
- 4 Dysuria, especially spasmodic
- 5 Cystalgia from whatever cause where the primary cause cannot be relieved
- 6 Dyspareunia and vaginismus (except those due to psychological causes)

OPERATION Anaesthetic — In our clinic a large majority of operations is done under spinal anaesthesia. We use a 1-200 solution of percain as we have done for many years (since 1931). Our cases with this anaesthetic now run into several thousands and we find it entirely satisfactory for all types of pelvic surgery. We have always used the Vienna (Dutt) needle and very rarely get a spinal headache in consequence as we think. For patients who express a firm preference for a general anaesthetic we use a C. E. mixture as a rule, but neither the relaxation nor the 'shrivelling' of the intestines can compare with that obtained by spinal.

The incision employed is the usual midline subumbilical. It is occasionally necessary to extend it an inch above the umbilicus if access is restricted. The Trendelenburg position is adopted, the intestines are packed well up, and a self-retaining retractor inserted giving a clear view of the promontory of the sacrum. The sigmoid flexure is displaced well over into the left fossa.

After a general survey of the pelvic viscera, appendix region and both ureters at the pelvic brim, the posterior peritoneum over the promontory is picked up between two forceps and raised as a transverse

fraenum, which is incised vertically by scissors for a length of some 5' or 6" On holding the edges apart with Alliss's forceps, the cellular tissue on each side is pushed towards the middle line. A good bite of this cellular tissue is taken up with toothed forceps and on applying a firm tug it is found to be very strong and resistant nerve tissue although it is easily raised away from the first sacral vertebra lying immediately underneath it. It saves effort if a single hook retractor is now hooked under this tissue and then begins a conscientious dissection with dissector and scissors to clear from each side into the grip of this hook all the up and down fibres running in connec-



tion with the main band of nerve tissue. The inferior mesenteric vessels must be identified in the root of the mesosigmoid and traced nearly to the aorta and cleared of communicating nerve fibres. The enormous left common iliac vein must similarly be cleaned with due caution be it said. The left ureter is usually not exposed as it lies covered by the sigmoid flexure at this level.

The apex of the clearance reaches the bifurcation of the aorta, and right side follows the right common iliac artery. The right ureter is cleared of nerve fibres and special attention is directed to breaking all fibres communicating with the main band on the hook, especially some quite thick ones which proceed deep to disappear under the common iliac vessels of each side. It is advisable to clean the immediate surface of the promontory with care because if the middle sacral vessels are injured it is not very easy to control them. They are closely adherent to the thick anterior vertebral ligament.

The plexus fans out below and should be traced down as far as possible. It is imperative that the dissection and division of all associated nerve fibres should be carried out widely and with a little practice this can be efficiently and speedily performed. When cleaned in this way, a length of about 3" of nerve is removed with scissors. There is rarely any need to ligate either end but our practice is to do the 'Cotte' first and pack in a little gauze before we proceed to do any other procedure, appendicectomy, Gilliam etc, which may be contemplated. This gives time for full haemostasis to be secured. The peritoneum over the promontory is easily closed with fine catgut.

POST-OPERATIVE PROGRESS It is noted that convalescence after a 'Cotte's' is unusually cheerful in most cases, there being a conspicuous freedom from post-operative pelvic pain.

Bladder evacuation has been easy and painless and no trouble experienced in obtaining bowel movement or control. Previously existing difficulty in effecting, micturition is cured where this has been due to nervous spasm, a not-uncommon complaint in patients with spasmodic dysmenorrhoea.

MORTALITY Apart from seven cases operated on for relief of pain of cancer,

there was one death in the series This mortem was found to exhibit advanced fatty degeneration occurred within 6 hours of the operation, and appeared to be due to anaesthetic shock in a patient whose heart at post-

RESULTS Our results are set forth in the following tables —

TABLE 1

Total number of sympathectomies in the series	100
No of cases with no follow-up	34
No of cases with follow-up less than 1 month (i.e. one period only)	5
No of cases with follow up under 3 months	18
No of cases with follow-up under 6 months	5
No of cases with follow-up under 1 year	2
No of cases with follow up over 1 year	35
Immediate death	1

TABLE 2

Operations by years

1933	11 cases
1934	16 "
1935	7 "
1936	16 "
1937	17 "
1938	18 "
1939 (upto November)	15 "

TABLE 3

Details of operative procedure adopted

OPERATIONS DONE

	C	CG	CGA	CA	Total
Cases followed up	21	16	20	9	66
Cases not followed	8	16	6	4	34

C———Cotte G———Gilliam A———Appendicectomy

Operations combined with the above according to indications

Operations on	Followed up cases	Not followed up cases
Tubes	Bil Salpingectomy 1 Unil " 1 Removal of tubal cyst. 1	Bil Salpingectomy 1 Unil " 1
Ovaries	Unil Oophorectomy 2 Unil Partial " 2 Bil Oophorectomy 1 Bil Partial Coph 2	Unil Partial Oophare, 1 Bil " " 1
Uterus		Hysterectomy
Tube & Ovary	Unil Salp Ooph	Unil Salph Ooph 1 Bil Salp & Unil Ooph 1
Cervix	Cauterisations 1 Dilations 3	Cauterisations 2 Dilatations 1

TABLE 4			TABLE 5	
Results		Percentage		
No of cases cured	42	64 5	No of cases operated for primary dysmenorrhoea	35
No of cases improved	17	26 15	No of cases without follow up	10
Cases showing great improvement	7	10 7	No of cases with follow-up	25
Cases showing moderate improvement	5	7 69	No of cases with follow-up under 1 month	1
Cases showing slight improvement	5	7 69	No of cases with follow-up under 3 months	6
No of cases not improved	2	3 07	No of cases with follow-up under 6 months	1
No of cases of variable follow up	4	6 1	No of cases with follow-up over 6 months	1
No of cases died in the whole series	1	1 0	No of cases with follow-up over 1 year	16
No of cases subsequently became pregnant	9		Out of 16 cases with follow up over one year	
No of cases operated for carcinoma	7		Cases completely cured	12—81 2%
			Cases with variable follow-up	2—12 5%
			Cases not improved	1—6 25%

TABLE 6
Follow-up results by years

Length of follow-up	No of cases,	N I	Var	Result			Cur.
				S I	M I,	G I	
Over 1 year	15	1	2	—	—	—	12
„ 2 years	7	—	1	1	1	1	3
„ 3 years	4	—	—	1	1	—	2
„ 4 years	4	—	—	—	—	—	4
„ 5 years	1	—	—	—	—	—	1
„ 6 years	3	—	—	—	—	—	3

N B N I — No improvement Var — Variable
S I — Slight improvement M I — Moderate improvement
G I — Great improvement Cur — Cured

DISCUSSION In the evaluation of any method of treatment, it is theoretically most desirable not to confuse the issue by adopting any additional or subsidiary procedure which might by itself produce or contribute largely to the relief of the primary symptom. Thus one would like from the academic point of view to be able to produce a series of spasmodic dysmenorrhoeas treated solely by presacral

sympathectomy and, better still, compare the results so obtained, with an equal series treated by hormones and/or by dilatation etc. In practice, however, it is palpably in the patient's best interests if such other conditions as displaced uterus, a pathological appendix, an adherent or cystic ovary found at laparotomy be suitably dealt with at the same time.

Hence in the above tables it will be seen that a majority of our cases had a combined type of operation, I do not think that great therapeutic effect can however be attributed to an appendicectomy or even to a Gilliam in the relief of dysmenorrhoea but I am equally sure that an adherent ovary whether due to pelvic inflammation or to endometriosis can materially confuse the issue, as it is sometimes very difficult to make a clear cut text-book diagnosis between the two main types of dysmenorrhoea and no doubt a number partake both of a spasmodic and a congestive character. By far the best results are obtained in spasmodic dysmenorrhoea, and the effect can be most dramatic. A girl whose life is haunted by the certainty of almost unbearable monthly pain comes back and tells you of complete relief. One patient called me a 'public menace' because she no longer knew her period had started till her underclothes were wet.

In carcinoma cases, relief has undoubtedly been obtained but such relief is usually only partial and of course does not

affect in any way the progress of the disease.

We know of nine of our patients who have become pregnant after the operation and some of them have been in our hospital for their confinement. There does not appear to be any alteration from the normal either in the painfulness or in the efficacy of their pains though it is found that none of them had either 'painful first stage' or inertia in labour.

SUMMARY

1 A series of cases of dysmenorrhoea and of pelvic pain operated on by pelvic sympathectomy is presented showing the results obtained.

2 The operative technique is described.

I hereby acknowledge gratefully my thanks to my house surgeons Drs B H Kamlapur and N V Modi for much help in the follow-up of cases, a task well known to require in India much perseverance.

स यदा भयमोहाभ्यां पक्वमप्यपक्वमिति मन्यमानश्चिरमुपेक्षते
व्याधिं वैद्यस्तदा गम्भीरानुगतो द्वारमलभमानः पूयः
स्वमाश्रयमवदार्योत्संगं महान्तमवकाशं कृत्वा नार्डी जन-
यित्वा कृच्छ्रसाध्यो भवत्यसाध्यो वेति ॥९॥

—सुश्रुत व्याख्यायां सूत्रस्थाने सप्तदशोऽध्यायः॥

If a physician convinces himself out of timidity or thinks out of ignorance that a (inflammatory) swelling is unripe when it is ripe & neglects it for a long time, the pus which has not been let out, bursts through its limits, and going deeper, makes a larger cavity for itself and finally creates a sinus; in this way it becomes either difficult or impossible to cure.

—Sushruta, Sutrasthana, 17th chapter,
9th verse.

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[No. 2

EDITORIAL

We have pleasure in submitting the second number of our journal for this year to our members

It contains the two remaining papers read at the last meeting of our association. The paper on thrombo angietis obliterans is most interesting. A fair amount of original investigation has been done both in Bombay and in Madras, but all workers are agreed that the end results are uniformly poor in this disease. One of us (S R M) during 1927-32 did a series of six arterio-venous anastomoses for this condition. He remembers undoing the Carrel clamp on the proximal side of the femoral artery in one case, to demonstrate to the students the greatly diminished blood flow. The jet of blood in that case reached a height of four to five inches only. The results of all these anastomoses were uniformly poor, amputation being required within periods varying from three days to three months. In three cases only could the pulsation be felt below the anastomosis for periods varying from four hours to three days. In five cases there was increased warmth, for periods varying from two days to three weeks. In none of the amputated limbs was the popliteal or brachial artery patent. (There were five lower and one upper limb). Ligature of the popliteal vein was tried in two other cases, without benefit. The only

hope in staving off the evil moment of amputation in such cases is early recognition of the disease, to which more attention must be directed. Once this disease is established it marches inexorably to amputation and often to death.

Dr Bharucha of Bombay has been kind enough to send in notes of a rare complication, namely, traumatism of the median nerve during a dislocation at the elbow. Dr T O Shah of Bombay has emphasized the importance of Ventriculography in the diagnosis of cerebral tumours and has sent us some quite good photographs of such tumours, as also an analytical table of 15 cases. Dr Sheshachalam of Bangalore has sent in notes of a very rare anomaly of the appendix. Mr Reddy of Vizagapatam has sent a note regarding judicial amputations in Sumatra in the good old days. We thank all these contributors.

We have with us now sufficient material for only about thirty pages for the next number. We earnestly request members to send in more contributions — case notes and articles — as early as possible.

The Secretary of the association informs us that the name of Lt. Col Shastri was inadvertently left out of the list of "Foundation Members," in the list published with the last number.

TREATMENT OF INGUINAL HERNIA

By Mr S R Moolgavkar, F R C S

There is nothing new that I have to tell you. I wish here to review the methods used in the treatment of inguinal hernia and give my personal experience regarding some of the methods I have tried.

Before we go further it is necessary to consider briefly the anatomy of the inguinal canal.

The inguinal canal in the male is a passage formed by the descent of the testicle and normally accommodates the cord. In the female it accommodates the round ligament and the canal is not such a gap in women. During the descent of the testicle the medial attachments of the internal oblique and transversalis to the inguinal ligament are pushed down and form a covering to the cord and testicle. That the cremaster is a covering not only of the cord but also of the testicle, can easily be seen in operations for vaginal hydrocele where one can see the muscle fibres stretched over the sac. As the testicle descends the path it has to follow is oblique from above downwards and inwards and we find therefore that a greater part of the transversalis is pushed down than the internal oblique. The cremaster muscle is not in a compact layer but is disposed in a thin sheet of fibres connected together by areolar tissue. In cases of hydroceles the musculature of the cremaster sometimes develops considerably but in cases of large herniae the musculature does not develop to the same extent but the fibrous tissue increases markedly in these cases. The reason is obvious, in one case there is a suspended weight which exercises the cremaster while in the other there is more stretching than weight bearing. I have seen a case of a hydrocele where the patient could contract the cremaster to such a degree

that he could raise the swelling quite two inches. The thickened and fibrous cremaster can become a nuisance during the course of a hernia operation.

The defect thus produced in the musculature of the abdominal wall is guarded by nature in two ways. Firstly by what is known as the sphincter action and secondly by valvular action. The sphincter action is that action by which the curved margins of the defect in the transversalis and internal oblique are straightened out and approximated to the inguinal ligament during contraction of the abdominal muscles, thus obliterating the gap. While this contraction is on—and the contraction usually takes place during some effort which raises the intra-abdominal pressure—the intra-abdominal pressure forces and closely applies the contracted internal oblique and transversalis to the tense aponeurosis of the external oblique which also necessarily participates in the contraction, in this way minimising and almost obliterating the space between internal oblique and transversalis on the one hand and the posterior aspect of the aponeurosis of the external oblique on the other. Abdominal contents are thus prevented from protruding from the abdominal cavity during periods of increased abdominal pressure due to effort of any kind.

In spite of such defence arranged by nature protrusions often occur. These are predisposed to by two defects: (1) the presence of a persistent funicular process or canal of Nuck and (2) muscular weakness. A patent funicular process or canal of Nuck leads to the formation of an indirect inguinal hernia. But there are other factors besides just the patent peritoneal process which contribute to the formation of a hernia in the human

being because there are many animals who habitually have such a persistent peritoneal process and yet do not suffer from herniae. In the human being the mesentery is longer than in animals and the mesentery is disposed obliquely to the vertebral column instead of transversely as in animals. Both these anatomical facts together with the erect posture are factors which predispose to hernial protrusions into the patent peritoneal process.

The weakened muscles lead to a bulge through the floor of the inguinal canal. Such herniae occur through Hesselbach's triangle and are therefore direct herniae. In some cases a direct hernia is due to thinness or weakness of the aponeurosis of the external oblique or to a large external abdominal ring, which do not afford the same support as under normal conditions.

Indirect inguinal hernia is very much more common in males than in females, about 10-1. A very interesting explanation has been given of this fact. In the male the weight of the testicle drags down a dimple of peritoneum or in those cases where a dimple already exists aggravates it. Whereas in the female the weight of the uterus pulling along the round ligament tends to correct any such dimple formation.

I have not yet seen a case of direct hernia in the female.

Having reviewed the anatomy let us now see what measures were adopted to cure a hernia.

Trusses to control the protrusion of a hernia have been in use for a long time. I here produce one which has been in use in Bombay. As you can see it consists of a rigid metal ring with a wooden pad controlled by a screw.

The spring type of truss is far superior in that, it exerts an elastic pressure, which automatically grades itself according to the

degree of pushing force from within. It is less cumbersome and when properly made is quite comfortable. However, the necessity of wearing it all the time while the patient is up and also at night when there are attacks of cough or sneezing, must be really irksome. Hope of cure by wearing a truss can only be held out in the case of children, upto three years of age at most. I have seen a hernia cured by the constant wearing of a skein of wool in a child from the age of six months to two years. It is claimed by some that a hernia can be cured by the constant wearing of a truss even upto the age of puberty. I have tried this in three cases of children aged 5, 7 and 7 over a period of a year but I must say without success. It is possible that the parents did not realise the importance of CONSTANT wearing of the truss.

We necessarily have to fall back on the truss when for one reason or another the patient cannot be operated on. It is our duty to see that the instrument maker fits the truss properly, and makes the spring neither too strong nor too weak. It must have been the experience of most of you to see a patient wear a truss with the hernia pouring out from behind it. Such a truss is worse than useless and is very often the result of the patient being economical and using a discarded truss from a second-hand shop. The same sort of thing one sometimes sees with spectacles. The truss should be applied directly to the skin. The perineal strap is a part which often gives trouble in this country where the genito-crural sulcus is moist and sticky as a result of sweating and often of intertrigo. I advise my patients to make removable and washable sheaths of soft thick cloth for the perineal strap and to change and wash these every day. In this way the strap is kept supple. Otherwise the strap soon becomes hard and rough and behaves like a rasp. The present day pads made of rubber bags filled with gas or glycerine or

sponge rubber certainly add to the comfort of the patient. In those that can afford it, and in all cases where a truss must be constantly worn, a celluloid covered truss should be bought for use while bathing. I need not say that the patient must be instructed to put on or even change a truss only while lying down and after the hernia is reduced. The shapes and names of trusses are legion. The tests of a good truss are that it be comfortable and that it keeps the hernia up under conditions of stress like coughing etc.

Prolonged wearing of a truss particularly one with too strong a spring produces a definite persisting depression in the inguinal region corresponding to the pad of the truss. I have found, in operating on such a case, that the aponeurosis of the external oblique was thinned out, and the lower edge of the internal oblique and transversalis pushed up.

A non-operative treatment which was much talked about two or three years ago is treatment by injection. The injection consists of a sclerosing fluid containing tannic acid and is injected in the inguinal canal and particularly round about the internal abdominal ring. Such treatment can only be used in cases of bubonocoeles. A series of injections have to be given. I tried it only in one case and as I did not have the proper solution I injected two c c of a 10% sodium morrhuate solution. The reaction was very marked, so much so that the patient could not wear a truss which is an essential part of the treatment, neither I nor the patient was satisfied and I have never again tried the procedure. An operation produces less reaction and is more certain.

In the old days they used to make the patient lie down continuously on his back for some months and they claimed a cure in many cases. Lying on the back is necessary

only for a fortnight after an operation. So why not operate?

In considering operation let us briefly review the change of thought and technique that has occurred since operations for hernia have been seriously taken up and which corresponds closely with the Listerian era. I give below a by no means complete chronology of operations for hernia.

- 1872 Paget stitched the external ring but did not interfere with the sac
- 1877 Czerny ligatured the sac as high up as possible through the external abdominal ring and sutured the pillars of the external abdominal ring
- 1879 Buchanan opened the sac and stitched the neck with a purse string suture. About that time others tried to obliterate the sac by cautery, chemicals or suturing
- 1881 Reverdin incised the aponeurosis of the external oblique and then sutured it, in order to make a better repair of the external ring
- Marey described suturing of conjoined muscles to inguinal ligament, but his description was lacking in detail
- 1883 Lucas Championiere opened the canal, excised the sac and overlapped the leaves of the aponeurosis
- 1884 Barker ligatured the sac and sutured it to the muscles above the internal abdominal ring
- 1886 Mac Ewen modified this and sutured up the sac into a ball and then sutured it to the muscles
- 1888 Bassini described the operation which goes by his name
- 1889 Halstead described his operation
- 1890 Trendelenburg used an osteoplastic flap from the pubis to strengthen the inguinal canal. He also tried implant-

- ing decalcified bone $1/3''$ to $1/2''$ thick to reinforce the canal
- 1892 Bull and Coley described the operation where the muscles were stitched down to the inguinal ligament in front of the cord
- Wolfler turned down the rectus sheath to reinforce the canal
- Kocher freed the sac as high up as possible through the external abdominal ring. Then seizing the fundus in a forceps, invaginated it in the sac and pulled it out through a small cut in the aponeurosis, opposite the internal abdominal ring. The sac was next twisted, ligatured and cut off. Later he used to take up the slack in the external oblique aponeurosis by stitching a fold of it to the inguinal ligament
- 1893 Schwartz turned down a flap of the rectus muscle to cover the inguinal canal
- 1894 Phelps used a silver filigree to strengthen the inguinal canal
- 1895 Andrew put the cord in a tunnel formed by the two leaves of the external oblique aponeurosis
- 1896, Duply and Cazin split the sac into two strips and tied them together and used the ends as sutures
- 1899 Ferguson amplified the operation of Bull and Coley and took up the slack in the transversalis fascia. He called it the 'Anatomic' operation
- 1900 Blake incised the rectus sheath laterally and brought down the rectus muscle through this and stitched it to the inguinal ligament
- Fiore used a gold wire filigree
- 1901 Mac Arthur used strips from the edge of the external oblique as sutures
- 1910 Kirschener used a free graft of the fascia lata
- 1913 Polya and Martelli advocated the turning up of a flap of the fascia lata to cover up the inguinal canal
- 1914 Marr took a strip 3 cm wide from the ileo-tibial band and used it to reinforce the posterior wall of the inguinal canal
- Neta used a crescent shaped piece of paraffin wax behind the cord
- 1917 Nageotte and Sensert experimented with flaps of dead fascia preserved in 70% alcohol
- 1918 Sampson Handley darned with silk
- 1919 Torek used silver wire to fasten muscles to the inguinal ligament
- 1920 Woolsey described his operation
- Hoguet modified Andrew's operation
- 1921 Gallie and le Mesurier used strips of fascia lata as sutures
- 1922 Skillern described his operation
- 1924 Mackenzie turned up a flap of the tensor fasciae femoris to cover defects in the inguinal region
- 1926 Koentz experimented with heterogeneous and ontogenous flaps of fascia preserved in alcohol 70%

It will be seen from the above that from a hesitating start with stitching of the external ring by Paget the sac was next attacked but not opened. In 1897 is the first reference to opening of the sac when surgeons began to be a little sure of obtaining healing without sepsis. From then on methods were changed and attached flaps were turned from the rectus sheath or muscle and even osteoplastic flaps from the pubic region were tried. As these failed extraneous materials like silver and gold filigrees, decalcified bone and even a crescent of paraffin

wax were used. It was not till 1910 that a free graft of fascia lata was used by Kirschner. The attention of the surgeons had so far been fixed to the inguinal region and once their attention was directed to the fascia lata which ordinarily was not exposed during the operation, suggestions for attached flaps and strips began to materialise till in 1921 Gallie and Mesurier described their method of using fascial strips as sutures.

The problems that face us are

- (1) Disposal of the sac,
- (2) Disposal of the cord,
- (3) Reconstruction of the inguinal canal

As long as there is any pocket depression or dimple on the peritoneal surface, there will always be the danger of the formation of a hernia. Our aim therefore must be always to make sure that a perfectly flat surface of peritoneum is presented to the viscera so that they shall not be tempted to explore any depressions and in that way lead to a hernia. In the case of an indirect hernia this is ensured by first of all defining the sac well and then cleaning it thoroughly at its neck, displacing to the medial side the inferior epigastric artery. I have found that the presence of the covering derived from the transversalis fascia (called internal spermatic fascia) prevents the complete pulling out of the sac sometimes. I always therefore make sure of this by a careful circular incision near the base of the sac. As the incision is made and the traction kept up, one can pull out quite $1\frac{1}{2}$ " to 1" more of the peritoneum. This is then transfixed and tied. Another likely cause of leaving a depression behind is the presence of a subsidiary sac on the medial side of the inferior epigastric artery. This point should always be made quite clear by passing a finger through the sac and finding out whether there is such a depression. More often than one would expect, there is much laxity of the peritoneum in this region, if not a

definite depression or sac. Such laxity of the peritoneum must be taken up and the peritoneum made taut.

The methods of Barker and MacEwen where after ligaturing or obliterating the sac, it is stitched to the transversalis and internal oblique muscles a little above and lateral to the internal abdominal ring is a method which I found to be harmful in that a much larger percentage of my cases recurred by this method. I think that the displacement and traction produces a dimple in the peritoneum and lays the foundation of a hernia.

I have not yet found the bladder protruding in an indirect hernia.

The most troublesome hernia to deal with is the sliding hernia where the viscus, usually the caecum or colon form part of the sac wall. The causation of this type of hernia is obscure. It is often suggested that the drag of the sac of a large hernia pulls down these viscera which are attached to the posterior parietal peritoneum and in such cases it appears to be an adequate explanation. But one comes across cases of sliding hernia where the hernia is quite small yet the posterior wall of the sac is formed by the caecum or sigmoid. How can we say here that the drag of the sac pulled the caecum or the colon down? A noteworthy fact to remember is that a sliding hernia never comes down as a direct hernia but always as an indirect one. In one case I found the caecum one third the way down the scrotum. In other words it always follows the path of the testicle. We believe that the testis descends because of the gubernaculum. Would it be too much to imagine that the same structure abnormally attached pulls the caecum or colon down? I have often found in cases of sliding herniae a thickened band passing down from the apex of the presenting viscus. The only difficulty about such a theory is, why

then are they not congenital? Of the operations for sliding hernia I prefer the method of Savariaud (See plate) Whenever I come across such a hernia, I always tell the patient's relations that the hernia is going to recur and unfortunately I have turned out a true prophet excepting in the last two cases, one of which was operated only two months ago so there is yet time

Another troublesome type of sac is that found in quite young children. Here the sac is so thin and friable and so adherent to the cord that it is indeed rare to be able to separate an entire sac. The same remarks are applicable to a hernial sac accompanying an undescended testis. In this latter case, when dealing with the testis I use Torek's method, liberating the testicle from the thigh after six months. In both these types of friable sacs one has to be content with a double purse-string stitch passed from the peritoneal aspect. By double I mean one below the other. An effort is always made to stagger the bites of the two stitches.

Interstitial hernia presents no special difficulty with its sac. I have come across three. The last one about 10 months ago unfortunately complicated by a sliding hernia. This also has not recurred so far.

In the case of the direct hernia the sac is more a hemispherical depression than a tube and one has to deal with it in a different way. There are some surgeons who entirely disregard it and devote all their energies to the reconstruction and reinforcement of the inguinal canal. Personally I always open it like the sac of the indirect hernia and hooking my finger in, pull on the peritoneum. By blunt and sharp dissection I take up all the slack and here, one often has to denude the bladder considerably in order to be sure of taking up all the slack. I next make a cut at the extreme medial end of the slack and start stitching the upper

to the lower leaf of the peritoneum left behind. I next make cuts along the upper and lower margins of the slack about an inch at a time leaving just sufficient peritoneum behind to come together snugly. In this way the slack is excised and the peritoneum made taut. The stitch used is a continuous mattress with a back stitch every 3-4 stitches. Very often one finds that there is an indirect sac as well (Pantaloon or saddle hernia). If there is a definite indirect sac I ligature it following the principles laid down above. I have found no ill effects regarding micturition follow the denudation of the bladder. Vessels ooze and are sometimes troublesome. I once had a haematoma from an overlooked vessel of the bladder.

The transversalis fascia is more developed and quite well seen as a definite fascial layer in most cases of direct hernia. When well formed it is always worth while taking up the slack in it and stitching it up, in order to reinforce the posterior wall of the inguinal canal. I do not believe in doing this just as a routine.

The next two problems namely disposal of the cord and reinforcement of the canal have to be worked out together.

Taking the reinforcement first, we saw while studying the anatomy of the inguinal canal that nature has provided against the protrusion of the abdominal contents by the sphincteric action and when this is effective the valvular action comes into play. The sphincter action consists in the approximation of the free edge of the internal oblique and transversalis to the inguinal ligament when there is a contraction of abdominal muscles during any straining effort. The gap between the lower border of the conjoined muscles and the inguinal ligament was obvious and a hernia particularly when large, occupied that space. What then but more natural than that they

should be stitched together and the gap obliterated and this today is a routine in practically all operations for hernia I say practically all because some surgeons do not approximate the conjoined muscles and the inguinal ligament in operating for a hernia in children provided the musculature is strong Marey proposed this in 1887 but to Bassini must be given the credit of emphasising it and bringing it to the notice of surgeons

There are one or two points about this which we must study In order that the muscle shall adhere to the Poupart's ligament both the Poupart's ligament and the edge the conjoined muscles must be free from fat and areolar tissue Unless this is conscientiously attended to, adhesion between the two will be weak and liable to give way under ordinary strains

A question rises here regarding the disposal of the cremaster muscle As pointed out before in cases of hernia the cremaster has much fibrous tissue added to it and in some cases it forms a mass which is as thick as the thumb This has to be provided with an exit from the canal which means that we have to leave a hole so much larger This in turn means a weak abdominal wall Rowlands and Turner say that the cremaster should under no circumstances be divided as it has the important function of pulling up the cord The cord is a flexible and soft structure and one cannot imagine how it is going to stem the progress of a hernia Personally I have not the least hesitation in excising the cremaster right from its attachments to the conjoined muscles and Poupart's ligament and for two or three inches along the cord I do this where the cremaster is much thickened in cases of oblique herniae and in all cases of direct hernia whether the cremaster is thickened or not In cases of a large testicle I anchor

the distal stump outside the external oblique I have seen no harm result therefrom excepting perhaps the loss of power of raising the testicle It gives a cleaner field to operate in, and improves the adhesion between the conjoined muscles and the Poupart's ligament and militates against recurrence

The next point we have to consider is regarding how to stitch When I was a student the material used was invariably kangaroo tendon and the stitches used were mattress stitches Catgut found favour soon afterwards All kinds of stuff must have been used for the purpose Torek in 1899 recommended silver wire for such stitches medial to the cord.

Torek believed that the divergence of the vessels and the vas at the internal abdominal ring invited the formation of a peritoneal dimple and so predisposed to a hernia He therefore used to separate these components of the cord and bring down the conjoined muscles between them and anchor them to the inguinal ligament by a stitch, in order to strengthen this weak spot. In cases of sliding hernia when these components are often widely separated by the hernia there is probably more justification for such stitches He used catgut for these stitches

The sac was split into two and the two split portions tied to each other and the remaining ends used as a suture for approximating the conjoined muscles to the inguinal ligament and also to reinforce the internal abdominal ring This method was used by Duplay and Cazin in 1896 Others have cut strips from the sac usually in a spiral manner and have used the strips for suturing the muscles to the inguinal ligament But the strips so obtained lack tensile strength because the arrangement of the fibres in the sac is mostly longitudinal and

in cutting the spiral they are cut across the grain

Considering the frequent failure of suture materials ordinarily used to anchor the conjoined muscles to the inguinal ligament and also considering that in successful cases it is fibrous tissue that holds them together, Gallie and leMesurier thought of obtaining strips from the fascia lata and using them as suture material. The selection of the fascia lata was ideal as the direction of the fibres is longitudinal and the fascia is of sufficient thickness. Fasciae for repair of the inguinal gap were used before but only as free transplants or as hinged flaps sutured into place by catgut. The important point about the fascial sutures is that they are passed through the muscles and the inguinal ligament and in that way they obtain a firm anchorage. The results have been very good and no modern surgeon will use anything else but these in cases of large or recurrent oblique and many direct herniae. It must not be imagined however that fascial sutures are a kind of magic wand because recurrences occur in spite of these. I have had two recurrences in twenty six cases. It must not be forgotten however that one uses these in those cases where with ordinary methods there would have been at least a 50% recurrence. Formerly a very long incision was made on the outer side of the thigh in order to obtain the strips. Nowadays one uses the special strip cutter through a two inch incision. The use of the cutter requires a certain knack in order to obtain long and uniform strips. The gap in the fascia lata causes no trouble.

Whatever material is used the stitches should not be so tight as to strangulate the tissues.

One has got to leave a certain space for the cord to come out some where. This brings us to the consideration of the disposal of the cord.

The cord can be disposed of in one of four ways

(1) Castration (2) Between the transversalis fascia and the conjoined muscles (3) Between the conjoined muscles and the external oblique and (4) In front of the external oblique

All these methods have been tried. I have tried to show the different variations diagrammatically (See plate). Castration for the sake of curing a hernia in a young person cannot be a justifiable operation. But circumstances may arise even in the young, such as coincident disease of the testis, where castration may be justifiable, it may be so in old people with extensive herniae. In the absence of the cord a complete and defectless closure of the inguinal canal is possible.

When the cord is placed between the transversalis fascia and the conjoined muscles (The Ferguson type of operation) the exit of the cord is at the medial end nearer the pubis. That being a weak spot, naturally such an operation is not suitable for a direct hernia. Nowadays I perform this operation regularly for indirect hernia, provided it is not too big. I do the Ferguson operation for bubonocoeles and the Andrewant imbrication for the smaller scrotal hernia.

When the cord is disposed between the conjoined muscles and the external oblique we have the Bassini type of operation. The cord comes through the conjoined muscles opposite the internal abdominal ring and passing obliquely down passes out of the canal at the external ring. Here a weak spot is situated opposite the internal abdominal ring in the conjoined muscles and another one through the external oblique at the external ring. I feel that the Ferguson makes a stronger job and I prefer it to the Bassini in cases of oblique hernia.

When the cord is displaced outside the external oblique, the medial angle between the conjoined muscles and the inguinal ligament and the external abdominal ring can both be closed completely the cord passing out almost straight out from the internal abdominal ring Halstead first described such an operation but in order to make the hole in the abdominal wall as small as possible he ligatured and removed all the vessels in the cord, leaving behind the vas with its vessels This naturally meant a very small hole for the vas only to pass out The result of the removal of the vessels sometimes was atrophy of the testicle and sometimes a hydrocele Such results naturally touched the patients in a tender and sensitive spot and removal of the vessels is now given up but the principle of displacement of the cord in front of the external oblique is still followed. I have not tried the Halstead itself but I have used the Andrew posterior imbrication many times and I have found that this method leads very often to swelling of the testis and sometimes to a persistent neuralgia of the cord and testis I have not tried the Hoguet or the Skillern operations (See plate) The method that I use now is Woolsey's and I find to be a very satisfactory operation for many cases of direct hernia For the recurrent or very large oblique hernia I use Gallie's sutures with the Ferguson method and for a direct hernia with very weak walls I use Gallie's suture in the Woolsey operation Gallie and Mesurier say "It is better to spend time in preventing a hernia entering the inguinal canal rather than waste it in trying to prevent a hernia leaving it" In other words more time should be spent in joining up the conjoined muscles and inguinal ligament very firmly and not much time be wasted on the external oblique Even though I feel that there is much common sense in this yet I do not

think that time spent on strengthening and tautening the external oblique in the front of the inguinal canal is wasted. I therefore always overlap the two leaves, following Woolsey

Whenever the subcutaneous fat is thicker than $1/2''$ I always bring the fat together by No. 000 Catgut It prevents accumulation of serum and blood and also helps in forming a thin scar,

In the skin I use thin silver wire Silver wire is smooth strong, non-absorbable and non-absorbent It probably acts as a very mild antiseptic in the stitch holes It can be perfectly sterilised There is only one snag and that is unless it is thoroughly annealed it is likely to kink and break, I use a blanket stitch just sufficient to approximate the edges Because of the tendency of the annealed wire to keep its shape each stitch acts like a lock stitch Removal is quite easy I keep a separate scissors for cutting the sutches

I still believe in the old spica bandage and I make sure that the hip is well flexed at the time the bandage is put on This ensures a firm pressure on the inguinal region while the patient is lying in bed with the usual pillow under the knee or the Fowler bed flexed at the hip and knee

I insist on the patient lying on his back for a fortnight Allowing the patient to get up within a week of the operation is stunty and impressive, and it is quite possible that many will get away with it without harm, yet, I cannot convince myself that even mild strains brought to bear on raw surfaces which are not yet firmly united can do no harm My usual formula is, sit up in bed on the fifteenth, sit out of bed on the sixteenth, walk about in the ward on the seventeenth and walk out on the eighteenth day of the operation I allow the patient to turn in bed gently from the 12th day

I ask the patient to be careful and not exert himself so as to involve a strain for at least three months after the operation

The one thing I am always worried about is a cough, after the spinal anaesthesia that I almost always use, the incidence of cough is not great but the risk of massive collapse of the lung and pneumonia is always there. I remember a case which developed much cough soon after the operation and left with a definite bulge in the inguinal region at the end of the usual period. In three months he had a definite recurrence. I always ask the patient to wear a truss if any such complication like cough or frequent sneezing arises. Naturally, during the healing period nothing like a truss can be worn.

Another thing I warn a patient against is about putting on much weight. If there is much increase of intra-abdominal fat the intra-abdominal tension is increased and the abdominal wall may yield at the site of the scar, which must be after all weaker than the sound abdominal wall even under the best of conditions.

I have already mentioned the sliding hernia which is a fertile source of recurrence.

Of serious sepsis fortunately I have had no experience, though I remember while a house surgeon in England, seeing a private operation by an eminent surgeon in London, go horribly septic. To add to the trouble silk had been used and sinuses giving birth to stitches persisted for many months. There was an induration like a thick plaque yet there was a recurrence three years later, after an attack of influenza, during which the patient coughed a great deal. So the

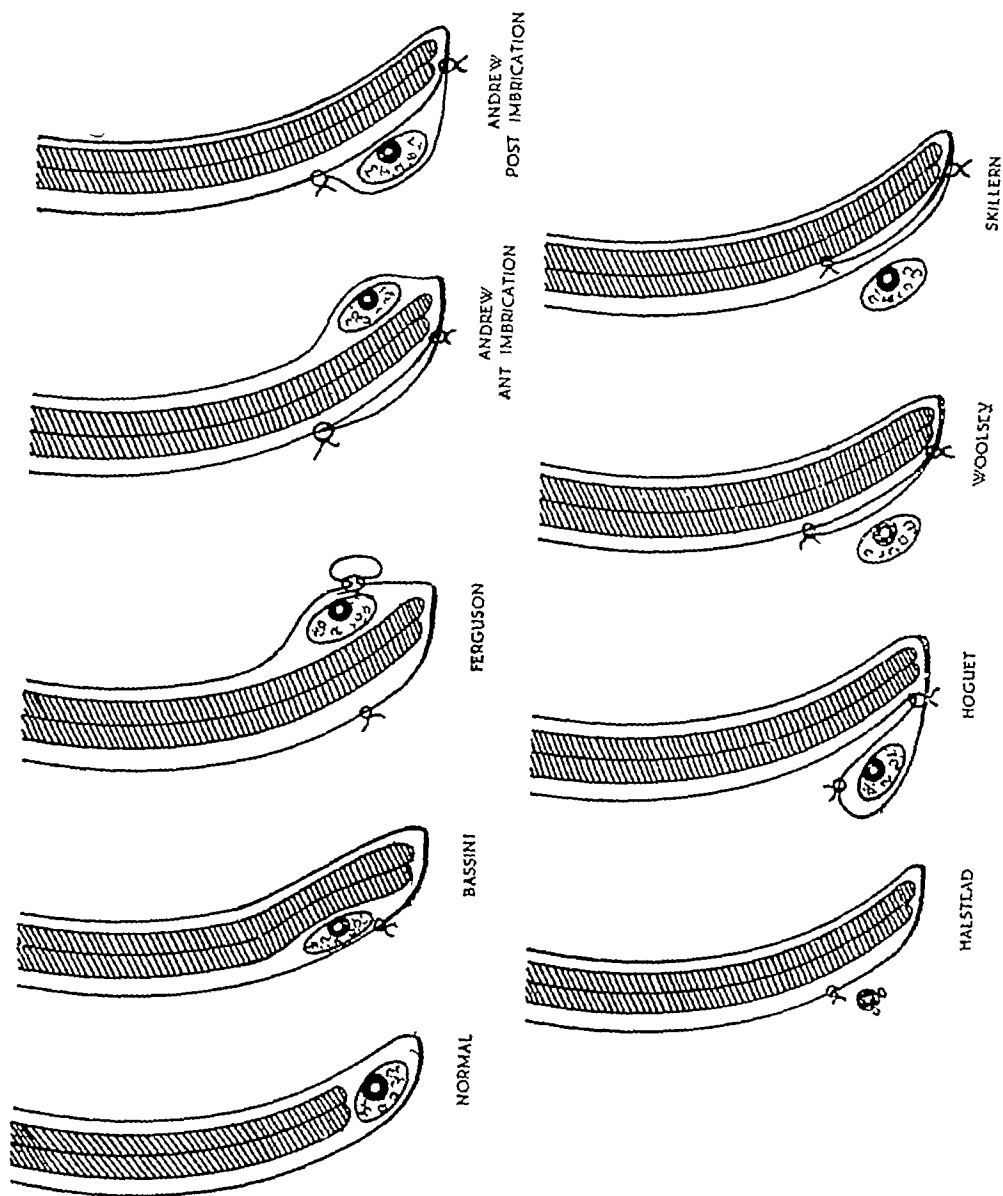
idea that sepsis by inducing fibrosis prevents recurrence cannot be quite correct.

I follow the universal rules in selecting cases for operation. I avoid operations in patients

- (1) Who have a persistent cough—till the cough is cured,
- (2) Who are constipated to a degree demanding prolonged and repeated strain. In this connection, I must point out that the Indian attitude of squatting while defecating affords a greater support to the inguinal region by the flexed thighs, than the European attitude of sitting on the commode,
- (3) Who have enlarged prostate or a stricture—till the prostate or stricture is dealt with,
- (4) Who are very fat—till a reduction of at least 10-20 lbs has been produced,
- (5) Who have a very large hernia. Here rest in bed, Trendelenberg position, supporting of the scrotum and moderate starvation are tried.
- (6) Who suffer from general conditions like anaemia, bad heart, cirrhosis, marked diabetes etc.
- (7) Who have VERY WEAK abdominal walls.

I have here outlined my experience and practice in the treatment of an ordinary inguinal hernia. I have left out the treatment of strangulated, inflamed, obstructed and irreducible herniae.

OPERATIONS FOR INGUINAL HERNIA



OPERATIONS FOR SLIDING HERNIA



SAVARIAUD



HOTCHKISS

A DISCUSSION FOLLOWED —

Dr M G KINI observed that Mr Moolgavkar has done well by reading a paper on hernia and thus bringing before the surgeons the necessity to investigate hernia and the result of the various operative procedure. Hernia is one of the common surgical conditions met within the surgical practice of any general hospital and so little is written about it. The speaker had already read a paper on this subject which was published in the Indian Medical Journal, August 1939, Vol VIII, No 11, page 640-646, which was distributed to the surgeons assembled. It must be the experience of all surgeons that not all the cases which they discharge as cured, were all real cures. Some of them must have recurred and when they did recur they instead of seeking the same surgeon's advice sought another's advice and treatment. It was difficult to assess the operative success of various methods of treatment as it is plain in the treatment of hernia there is more than one method advocated. The investigation of Mr Max Page in London gives a fair index of recurrences after operations for hernia. He found 11.5% of cases operated for hernia in the London Police showed recurrence. London Police being composed of men with a standard build and uniform physical fitness, the post-operative recurrence may be taken as a fair index among a type of people whose physical fitness build and occupation is of a uniform nature. It is presumed that the operations were all done by men of experience. In India there are no statistics showing the follow-up results of a particular line of treatment adopted in a particular class of people. Dr Kini requested the surgeons to follow a particular line of treatment and ultimately find the results of such a procedure to evaluate the different methods of operative procedure for hernia. Till then it is difficult to assess

the value of various types of operation. In treatment for hernia apart from treating the local condition he suggested that the surgeons should try and investigate the body mechanics of the individual. It is important to note that the relation of posture and stature has a definite bearing in the recurrences of this condition. The work of Goldthwait in this direction has been of great benefit and in the speaker's experience has helped him to understand some of the recurrences apart from the usual text-book causes. The abnormal stature and posture must be considered as an important factor in the causation of recurrences. He illustrated as an example with a diagram showing the normal shape of the coelomic cavity in a normal individual where the cupola of the diaphragm was roomy with good fixation of the liver, the spleen, the stomach, the intestine, and all other organs in the cavity. In such an individual should a change occur as it might happen due to postural defects or deformities in the spine, or to neuromuscular incoordination or paralysis or changes in the intra-articular fibro cartilage or to disease of the nucleus pulposus altering the curvature of the spine it necessarily follows that a change in the shape of the coelomic cavity will occur with consequent change in the position of the internal abdominal organs, thus causing a strain in the lower abdominal segment. It happened in one case of the speaker where at the time of operation the patient was a normal individual on whom Bassini's operation was done with good result at the time of discharge and had good post operative care. At the end of six months, he returned with a recurrence. On examination it was found that he had lost the tone of muscles of his abdominal wall with lordosis of the spine and a corresponding compensatory curvature in the dorsal region. He was examined

medically by the specialist and was treated for his general run down condition. He was advised to report at frequent intervals. Subsequently he was admitted on the medical side for pernicious anaemia with sub acute combined degeneration. This is an example of recurrence in an individual where postural changes occurred as a result of the weakness of the muscles and changes in the spine due to pernicious anaemia.

Dr KINI observed that 5% of the cases of hernias he operated were very large hernias descending up to the knee. In the treatment of hernias he used kangaroo tendon in the suture of the conjoint tendon to Poupart's ligament. He considered it very useful suture material to be employed. He stated that he was not in favour of the removal of the cremasteric muscle and fascia as suggested by Dr Moolgavkar, as he utilized this cremasteric muscle and fascia to strengthen the floor of the inguinal canal by plication suture in Bassini's operation. He observed that he was of late doing Mitchell-Bank's operation in ordinary small hernias by isolating the sac without cutting the aponeurosis of the external oblique and dissecting the sac right beyond the neck using a transverse incision. He stated that it is necessary to dissect the neck of the sac from its attachment to the internal ring which in some cases was found to be firm and cartilagenous to the feel. By overlooking this important point some of the recurrences may be explained due to this want of care. Operations for hernia associated with undescended testicles are difficult problems in adults with added difficulty when they get strangulated. In some of these cases torsion of testicle was a complication. Hernias associated with elephantoid scrotum are another difficult problem and the question that arises is whether the elephantoid scrotum should be dealt with first or the hernia first. The speaker advocated

the performance of both the operations at one and the same time, first dealing with the hernia condition before proceeding to deal with the elephantoid condition. In indirect hernias the speaker found a peculiar type of hernia where there was a gap in the aponeurosis of the external oblique extending right up from the external to the internal ring. In some cases of indirect hernia the sac was of an interstitial type and in such cases the bladder was almost always found in relation to the sac and thus begged to defer from the observation of Mr Moolgavkar. The speaker had six cases of sliding hernia in a series of 363 cases and he employed the technique of Savariaud with great success and 2 of the cases that replied to the letters written showed no recurrences at all. In some old people the best method of dealing with such a hernia is to remove the testicle and close the canal completely. The speaker observed that in his series of operated cases, 7.8% showed recurrences and he impressed the necessity to bear in mind the study of posture and stature in relation to these recurrences. It is necessary among the working classes to give proper advice regarding the nature of work that the individual has to do after operation. The type of individual has to be selected for the work that he has to do, for example, a thin tall man should not be advised to do heavy load bearing work. For this type of work a different class of men with a heavy build is suitable. The selection of a person for particular kinds of labour will probably help in the diminution of the number of recurrences in the labouring classes.

Dr R. MAHADEVAN put forth a suggestion for treatment of sliding hernia and he proceeded to explain it by a diagram, the principle of the operation being on the lines of Lockhart-Mummery's operation for prolapse of rectum. The usual inguinoscrotal incision is made and on exposure, if

the condition is found to be a sliding hernia, return the contents, e.g. the caecum and ascending colon into the abdomen. This being a sacless hernia, there is no peritoneum behind the caecum and ascending colon. Proceed as for extra-peritoneal exposure of the ureter pushing the contents upwards and inwards and pack the cellular space with vaseline gauze from outside the external iliac vessels to just below the lower pole of the kidney. Close the incision by the usual methods, bring the vaseline gauze end at the top of the wound. Keep the patient in slight Trendelenburg position and the bowels bound for 3 or 4 days. Afterwards gradually pull out the vaseline gauze in the course of about 3 weeks. It is expected that adhesions will form between the gut and the retro-peritoneal cellular tissues and prevent further sliding. Dr Mahadevan said he had not tried this particular method himself but brought it forward as what he thought to be a new suggestion and invited opinion.

Dr C CONDILLAC said "I bring to your attention the following statistics collected since 1929. The only reason for offering conclusive comment in such a small series is that they occurred among British troops and railway employees where control and follow-up of patients offers ideal conditions.

236 cases among British Troops the work of four Surgeons in 6 years, following various methods in vogue show 14 recurrences after 2-3 years.

The only common factors were the general good nutrition of these cases, the superior muscle tone of trained men, routine medical examinations permitting early diagnosis and operative-treatment, long post-operative rest in bed, light work not-involving lifting of weights or pulling or other strenuous duties for 2-3 months.

The second series of 104 from among Railway employees, Indian and Anglo Indian, show an 8% recurrence after 2 years follow-up. Here the general nutrition and muscle tone were poorer and the co-operation of patients sometimes lacking.

These results are the outcome of the common factors of early diagnosis, early operation, improvement of muscle tone by dieting and vitaminizing, 3 weeks' strict rest in bed after operation, 3 months' light duty after discharge.

Operative repair was limited to Wyllys Andrews method for large hernias, and suture in normal planes with correct apposition, for small Hernias with little local distortion. Fascial or catgut suture is used, after scraping away areolar tissue and fat with the edge of the scalpel or rubbing with a swab dipped in ether. Spermatic fasciae are turned back after gauze dissection to form a plugging of scar tissue at the external ring.

Patients are kept in bed 3 weeks or more with the thigh flexed and an abdominal binder or belt worn.

Ladies and gentlemen recurrences could be lessened by paying more attention to the improvement of muscle tone and the avoidance of post-operative strain long enough to allow a firm scar.

Dr N S NARASIMHAM, said "The presence of a patent funicular process was observed by Hamilton Russel and a further report was made by Philip Turner. I have noticed it only in two instances in 90 cadavers during five years in the operative surgery classes (Madras Medical Journal Vol XVII No 3 July 1937).

Regarding the sex incidence. The incidence, of inguinal hernia in the female is much less than 1 in 10 in Madras. 3 females in 100 cases in my series, the ages are 1½, 14 and 35.

This infrequency of hernia both inguinal and femoral in this country in spite of the weakness of the abdominal wall due to early and repeated pregnancies and in spite of the fact that no abdominal support is worn by the women is noteworthy. Paraumbilical hernia on the other hand is common enough.

Regarding the technique of the operation, any procedure done without incising the aponeurosis of the external oblique is no good, the operation for hernia must be the removal of the sac and the whole sac, the oblique circular incision near the base of the sac is very helpful, secondary sacs commonly present must be removed.

The conception of the Bassini procedure is quite good, the operation as performed by Bassini has been described in a book published by H K Lewis & Co, London. Hernia is said to be a notifiable condition in Italy and there is a large institute for hernia in Milan. In Milan the percentage of recurrence in the first 5000 cases was 2 to 4%, in the second 2500 it was 2% and in last 2500 it was nil.

The cremaster has to be excised and it will reduce the size of the sac. Regarding plication of the external oblique it has to be remembered that in a healthy adult with good muscles it would be seen that the aponeurosis is under tension, it is only with lax muscles that this method of plication is possible, tight suturing of the aponeurosis which is one of the most poorly nourished tissues of the body is not correct. The causes of the failure of operation are —

(1) Infection, (2) lack of complete haemostasis (3) slipping of the ligature or suture from neck of sac (4) non-removal of the sac completely (5) tension of deeper structures (6) persistent vomiting (7) poor musculature (these cases require fascial graft) (8) any acute infectious disease occurring soon after the operation,

I have found the bladder in 9% of cases in indirect herniae (Madras Medical Journal Vol XVII No 3 July 1937)

A pre-operative course of gymnastics and exercise will be beneficial. The careful post-operative regime described by the opener of the discussion is very essential.

Sliding herniae are common, the difficulty experienced by me was the separation of the sac. There is no real sac, the posterior parietal peritoneum descends, these cases are of two types, in one there is a small sac and a small hernia in the other the hernia is of large size. In the case of a small sac and a small sliding hernia, the incision is extended upwards and outwards. The internal oblique is exposed, a muscle splitting McBurney procedure is adopted and the peritoneum opened. Traction upon the intraperitoneal continuation of the prolapsed intestine will soon replace it into its normal position. Anchor the intestines to posterior parietes, it is then found that only a small hernial sac is present which is readily closed by a suture. In the large herniae, a paramedian incision on a level with the umbilicus is made. Simple traction upon the intraperitoneal portion of the intestines in a cephalad direction will reduce the prolapsed colon easily. The posterior parietal peritoneum is fastened to the retroperitoneal tissues as near as possible in the normal position. It would be observed that there is no hernial sac and the operation is completed. It is a safe procedure and one has to try this before he realises the value of this procedure.

Dr F. S. GOPALAN said that as regards the presence of bladder in inguinal hernia, he agreed with Dr Narasimhan and observed that bladders were met with in a large number of cases. In one case he also encountered the ureter.

As regards the occurrence of inguinal hernia in the female, Dr Gopalan recalled

two instances where it occurred in young female children. In one of these cases he darned with silk. The patient did very well. He agreed that fascia lata was the best material for darning. He suggested that silk filigrees also could be used after experimentation.

A case of recurrence due to sepsis was then recalled by Dr Gopalan. In that case, on dissection the lateral part of the inguinal ligament was completely absent. He cut a flap from the rectus and brought it and stitched it to the femoral fascia and subsequently reinforced it with silk.

Dr CHOLKAR remarked that a course of injections with Proliferol A & B gave very satisfactory results in the case of hernia. He recounted a case in which there was no recurrence. The medicine was quite harmless.

He advised smaller doses for a longer time along with muscular exercises, wearing of a suitable truss for at least 6 months.

Dr S R MOOLGAVKAR in replying to the debate said "Mr Kini has referred to research. The whole idea of our meeting here is to promote research in surgery by listening to the views of different surgeons and then putting the various principles or methods suggested to the test.

I must say that I have not looked upon the hernia from the same angle as Mr Kini but I certainly shall keep his remarks regarding the erect or invert egg shape of the coelomic cavity in mind.

The cremaster as has been pointed out above is of too loose a structure to afford any adequate support used as a reinforcement to the inguinal canal.

Mr Mahadevan has suggested an operation similar to Lockhart-mummery's operation for prolapse in cases of sliding hernia.

The trouble is to diagnose a sliding hernia before operation and in order to carry out Mr Mahadevan's idea another incision will be necessary.

I must congratulate Mr Condillac for his definite statistics. His suggestion for a sling for the scrotum is very similar to the Bellevue hospital sling. The trouble with this is that when the scrotum gets displaced underneath it, it is most uncomfortable. The ordinary pyramidal pad or pillow is usually comfortable enough.

Mr Cholker's advocacy of "Proliferol" can under the best of conditions affect only the treatment of small bubonocoeles.

Mr Narsimham's finding of 2 patent funicular processes in 90 dissections does not correspond to the European experience of 10%.

Mr Gopalan's finding the bladder in indirect inguinal herniae must, I think be in those cases which are pantaloon herniae where the bladder is frequently found in the medial sac. A silk filigree would be very difficult to fix in place and involve a lot of stitching besides being a foreign body.

I have no experience of the incision in the anatomical crease.

The President in his concluding remarks observed as follows:

'We have listened this morning to a very thorough and illuminating discourse on inguinal herniae. The subject has been treated from all its aspects and I must compliment Dr Moolgavkar and others who took part in the discussion on the high standard maintained throughout the debate.

I have no experience of treatment of inguinal herniae by injection and it is my invariable practice to recommend an operation whenever possible unless there are

contra-indications therefor In the latter cases a truss is advised. Regarding operations for herniae, so many have been described A surgeon gets used to a certain operation for the condition and he adheres to his method for all cases as far as possible. The principles of treatment remain the same for all They are, 'remove the sac and treat the canal' I always incise the external oblique and clear the sac as high as I can In doing so I often see the bladder, whether the hernia is direct or indirect, I clear the sac off the bladder wall and get as high as possible before I twist and transfix the neck and cut off the redundant portion.

Regarding inguinal canal I try and give a strong posterior wall by suturing the muscles and conjoined tendon to the Poupart's ligament, as well as the external oblique aponeurosis behind the cord The stitches should take a good hold of muscle and fascia but there should not be too much tension on the sutures nor should they be tied too tight I use hardened catgut for the purpose and employ silk but rarely The fear of leaving non-absorbable material like silk in the inguinal canal is rather exaggerated If sterility could be assured and one's technique is reasonably correct, there need be no fear of using silk if circumstances demand extra strength and durability in the sutures The usually redundant hernial coverings as well as the hypertrophied cremaster muscle should be removed to reduce the bulk of the cord

and to ensure sound healing The remainder consisting of the vas with a few vessels of supply should be left and this would enable us to close the canal snugly round it without leaving gaps through which a recurrence may later develop

I do not keep my patients in bed more than 10 days and especially in the case of the elderly man I encourage movement in bed from the third day and after the 8th day I get them out of bed This helps a great deal and I have very few cases of post-operative chest complications

In this part of India elephantiasis of the scrotum is common and many people neglect their herniae, so that occasionally you get a combination of these conditions, when the problem may arise as to what to do Both the conditions should be operated upon together and primary healing is the rule In a case of early herniae with elephantiasis of the scrotum there is no reason why operation in the ordinary way should not be done but there are cases where very large herniae containing practically the entire gut are hidden by a filarial scrotum of huge proportions Such cases should not be operated upon, for when the thickened scrotal tissues are removed, it will be found that there is not enough room in the abdominal cavity for the gut which has lain for many years outside Forcing them into the abdomen in these conditions would cause death from cardiac embarrassment within a few days

FRACTURE DISLOCATION OF LEFT ELBOW WITH PARALYSIS OF LEFT MEDIAN NERVE

By D R BHARUCHA, F. R. C. S (Eng)

Honorary Surgeon, Petit Parsee General Hospital, Honorary Assistant Surgeon, Sir J. J. Hospital, Bombay

Mrs S P G a woman of 70 years was admitted under my care at the B D Petit Parsee General Hospital Bombay, on 21-3-39. The day previous, whilst walking she had slipped and fallen on her left side. Immediately she complained of much swelling and pain in her left elbow joint which was locked in a semi-flexed position. Clinically a diagnosis of a backward dislocation of the left ulna and radius

displaced laterally and the semilunar notch of the ulna was in relation to the capitulum of the left humerus. Besides, there was a fracture of the external epicondyle of the humerus.

On 22-3-39 under general anaesthesia the dislocation was reduced completely and the forearm was kept at an angle of about forty degrees to the arm and fixed in



on the left humerus was made but the swelling due to oedema was too great to define any further details. Radiograms in two planes showed that she had also a partial lateral dislocation of the elbow. The head of the left radius was entirely

that position by a posterior plaster of Paris gutter-splint, care being taken that the brachial artery was not pressed upon.

For the first time on 25-3-39 the patient complained of inability to completely flex her left index finger together with

tingling and numbness of the same digit Further examination revealed that she was suffering from paralysis of the left median nerve below the level of the elbow. The paralysis was both motor and sensory

About ten days after the reduction, the patient was treated daily by galvanic current stimulation of the left median nerve and passive movements of the fingers of the hand This was continued for a month. The plaster of Paris splint was removed and was replaced by an ordinary sling and galvanic current stimulation continued From 6-7-39 Faradic current stimulation was started On 26-7-39, it was found that there was a good response to faradic current stimulation and that the sensations in the distribution of the left median nerve were recovering On 4-8-39 she was discharged better and asked to report again

On 16-1-40 I re-examined her and found —

Movements of the left elbow joint perfect Active pronation and supination were present and of full range Slight ache present in left elbow joint and left forearm

Motor-power good but less than on the right-side. Inability to flex completely the left fingers due to stiffness Left thenar eminence full and equal to the right Movements of the left thumb of full range She can oppose the left thumb to the other fingers just as well as on the right side She cooks daily and can sew with machine or with ordinary thread and needle With her left hand she can fasten the small hooks on her blouse

Sensations Both epicritic and protopathic sensations present but less than on the right side Temperature sense good Sense of shape not very good

The accompanying radiograms show the extent of the injury

APPENDIX DUPLEX,

By Dr T Seshachalam, Surgeon and Medical Officer, Victoria Hospital, Bangalore

Variations in the character, position, mesenteric attachment and arterial supply for the vermiform appendix are common, but the extremes of variation—congenital absence and double appendix are so rare that every authentic case coming under the observation of the anatomist or the surgeon deserves to be placed on record David M Greig has made a very critical review of this subject in the Edinburgh Journal of Medicine of April 1934 and A J E Cave has written an exhaustive paper on this subject in the January 1936 issue of the Journal of Anatomy, both of which papers have been freely used in the preparation of this paper

I CONGENITAL ABSENCE

Four authentic cases of congenital absence of the appendix are recorded In a study of 4 392 recorded cases collected from different authors Cave was able to find one case reported by Fawcett and Blanchford in 1900 Green and Rose have reported absence of the appendix in 1933 and Feldman one other case in 1934 The fourth case is the specimen in the teratological section of the Royal College of Surgeons, Museum in London in the case of a new born infant The two cases of complete absence of the caecum and appendix, one reported by Robinson and

the other by Elliot Smith are not included in this list

II DUPLICATE APPENDIX

For purposes of description A J E Cave classified the known examples of this abnormality into three types

(a) Single caecum with an appendix showing partial duplicity

(b) Single caecum with two distinct appendices

(c) Double caecum, each caecum having its own appendix.

Rosenberger, Prentiss and Elwyn have each reported a case of a single appendix presenting two distinct lumina with common muscular and serous coats. A fourth, and an interesting case, recorded by Walther, is one of a normal single appendix divided into two parallel tubes, which sharing a common musculature, re-united distally to re-establish their original common lumen".

Of two distinct appendices five cases are on record. Patterson and Emerys Roberts reported in 1906 a case of "a small sacculated and curved appendix" lying on each side of the caecum each being pathological. In 1933 Clavel and Colson reported a double appendix in a woman of 30 years of age each quite distinct except for a common peritoneal investment. The case reported by Wilson had an appendix at the apex of the caecum and another at the postero-medial aspect of the proximal part of the caecum each having its own mesentery.

The third type of double caecum and double appendix are mere surgical curiosities. Greig found "the whole bowel duplicated distal to the site of Meckel's diverticulum. Two separate caeca were present each having its proper vermiform appendix"

Specimen No 548 Da in the teratological series of the Royal College of Surgeons' museum in London illustrates a similar example

The case herein reported was found at operation in a male adult aged 25 years, the subject of chronic appendicular trouble. The caecum which was freely mobile, had on its postero-medial aspect a double appendix. Each one of these was a



distinct entity except for a common peritoneal investment. They were separated proximally by a small interval and adherent distally. The mesentery was bifid at its base carrying two sets of blood vessels. Radiograms of the specimen taken with opaque substance injected into each lumen separately show the lumina to be separate and quite independent of each other. Histological examination of each of these appendices demonstrated that each had the typical structure of the appendix in regard to epithelium, glands, lymphoid tissue, muscular and serous coats. This case is a fur-

ther example of the complete duplicity of appendix under type (b) — a single caecum with two distinctly separate appendices,

The macroscopical appearance of this specimen the radiological evidence and the microscopic appearance of the section of the two limbs are sufficiently critical to place this case on record as a definite case of appendix duplex, although the specimen and the report emanate from the operation theatre

Various explanations are given for this abnormality, but the one advanced by Kelly and Hurdon seems reasonable. They investigated 50 human embryos from Moll and Brodel collections and found a second appendix making its appearance in the sixth week and called it "Transient Appendix", a fact which has been confirmed by Gladston. In the persistence and further deve-

lopment of the "transient appendix" lies the explanation of cases of double appendix occasionally seen

SUMMARY

Congenital absence and duplicity of the appendix are extremely rare. The literature up to date has been reviewed. A typical case of appendix duplex has been reported.

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VENTRICULOGRAPHY

By T. O. Shah, F. R. C. S.

Ventriculography is a valuable addition to the measures for diagnosis and successful treatment of cerebral tumours. It has got its limitations, used indiscriminately, it may increase the mortality, used wisely, it will help greatly in the successful result of the operation.

The chief use of ventriculography is in the localisation of a cerebral tumour. To operate without localization means an unduly prolonged operation, much manipulation and very often an incomplete operation. Signs and symptoms are not always helpful in localization. Many times we have seen operations performed and no tumour found at operation,

yet on post-mortem examination a tumour was detected in quite a different place. If we examine the post-mortem specimens, a general impression is produced that many times ante mortem localization was poor. This is not the fault of the surgeon. If you study the signs and symptoms of such post-mortem cases, you will realise that localization was impossible in many cases. Something more than signs and symptoms, X-ray and cerebro-spinal fluid examination was necessary for localization and this has been supplied by ventriculography. For diagnosis, signs and symptoms may be enough. They may be enough even to localize the side on which the tumour is situated. But to localize the

exact site they are often insufficient. Out of all the signs, papilledema is the most reliable, to determine on which side the lesion is. Even when other signs are absent, head-ache and papilledema are present. Papilledema is more marked on the side of the lesion. For early diagnosis and localization of the side, the condition of the retina and optic disc are certainly the most important. A table of the signs and symptoms of 15 cases is given below. This will clear the point that papilledema is the most constant and reliable sign to determine the side on which the tumour is situated (See table at the end).

MECHANICS OF VENTRICULOGRAPHY

Ventriculography demonstrates the distortion of the ventricles. This distortion is not

and this dent is not obvious in the ventricle inside because the brain substance is not rigid enough (See figure 1).

Ventricular distortion is produced by three different factors. Firstly the tumour penetrates the wall of the ventricle and obliterates either of the horns or the body of the ventricle (See Fig 2).



Fig 1

produced by pressure on the surface of the brain. A tumour on the surface merely produces a dent in the cerebral substance,

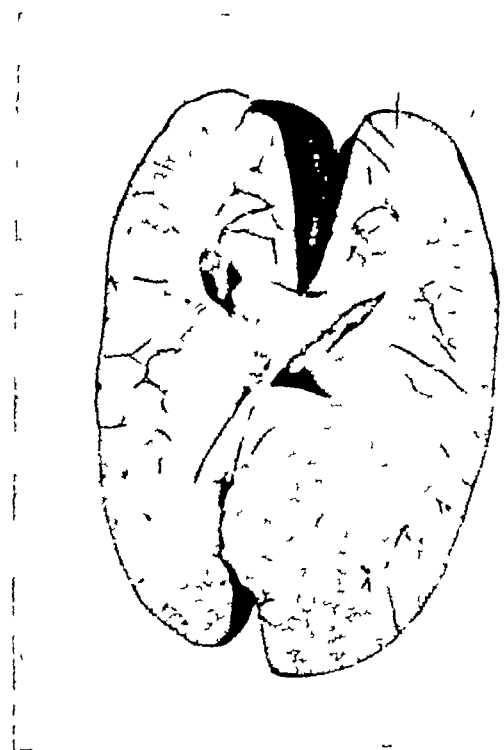


Fig 2

Secondly the tumour may be situated in the ventricle and it may produce a filling defect.

Thirdly the tumour may be in the path of the circulation of the cerebro-spinal fluid, for example, at the foramina of Munro, pineal body, corporae quadrigemina, vermis of the cerebellum, and cause obstruction to the flow of the fluid and consequent dilatation of the ventricles (See figure 3).

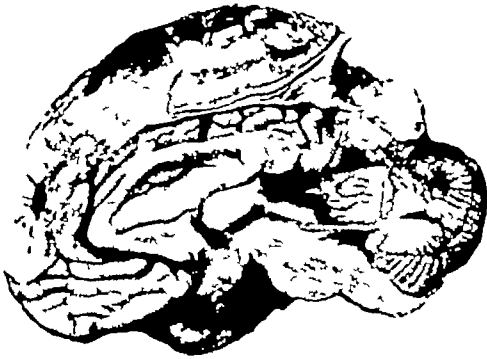


Fig 3

In short, general compression and localized pressure on the surface of the brain cause no distortion of the ventricles. Therefore ventriculography in surface tumours will be of no value. It will be useful

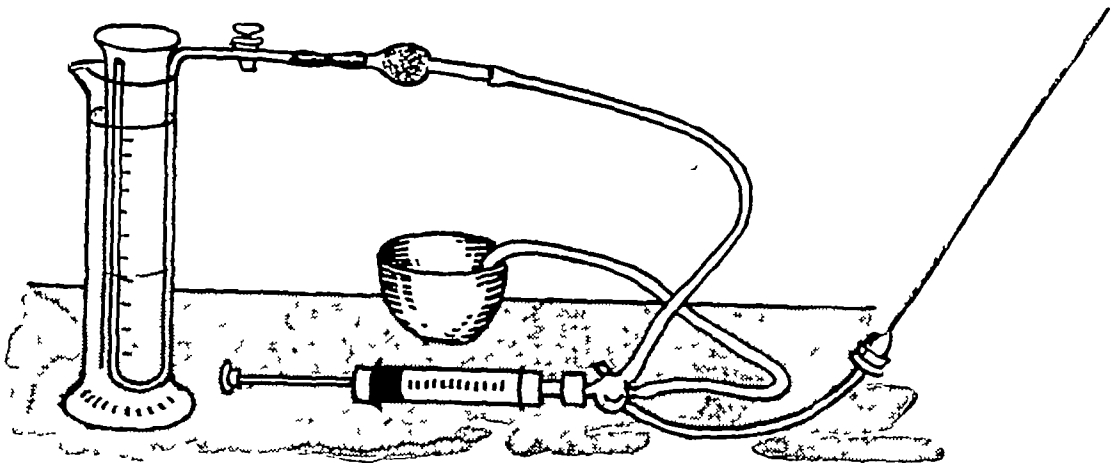
TECHNIQUE OF VENTRICULOGRAPHY

TIME

It is best done at the time of the operation. By doing it at the time of the operation it saves anaesthesia, mental strain of waiting and if the intracranial tension rises after the injection of air, it can be relieved at the operation. Ventriculography does not take more than a few moments and the risk is not increased. Whether operation should follow immediately after the ventriculography depends on the length of time spent in doing the latter.

SIDE

Ventriculography should be done on the side opposite to that of the suspected tumour. On the affected side, ventricles may be distorted and there is more likelihood of not entering the ventricles. After injecting air on the one side, take a X-ray picture in an antero-posterior direction. If the ventricles are visible on both the sides injection of the other side is not necessary. If the other side does not show up injection of both the sides will be necessary to localize the site.



Diagram

only in cases of tumours affecting the wall or cavity of the ventricles and in the case of tumours in the path of circulation of the cerebro-spinal fluid.

THE APPARATUS.

The apparatus selected consists of a three way stop cock, a 20 c c syringe, a double mea-

sure glass (one inverted into the other) U shaped glass tube a long needle and a bowl (See diagram) With this apparatus, the whole procedure becomes easy, accurate and quick. The spot selected is one inch from the middle line and one inch behind the parietal eminence. Make a small linear incision down to the bone. Trephine a small hole with a Hudson burr, insert the long needle through the dura mater into the cerebral substance downwards and slightly forwards till it enters the hollow cavity. Connect the needle to the apparatus. Draw the cerebro-spinal fluid about 30 c.c. and replace it with air 20 c.c. The air injected should be less than the fluid withdrawn because the air expands, and may cause an increase of intracranial tension. After injecting the air, remove the needle and close the wound. Take a X-Ray picture immediately in an antero-posterior direction. If both ventricles are not visible proceed to inject air on the opposite

and occipital up) and two lateral, (right up and left up). Above is a ventriculogram of a cerebral tumour on the left side and in the temporal lobe.

DANGERS —

1. Ventriculography is not without a small mortality. Therefore it should be employed only in cases of a positive diagnosis of a tumour. It is used only to localise the site.

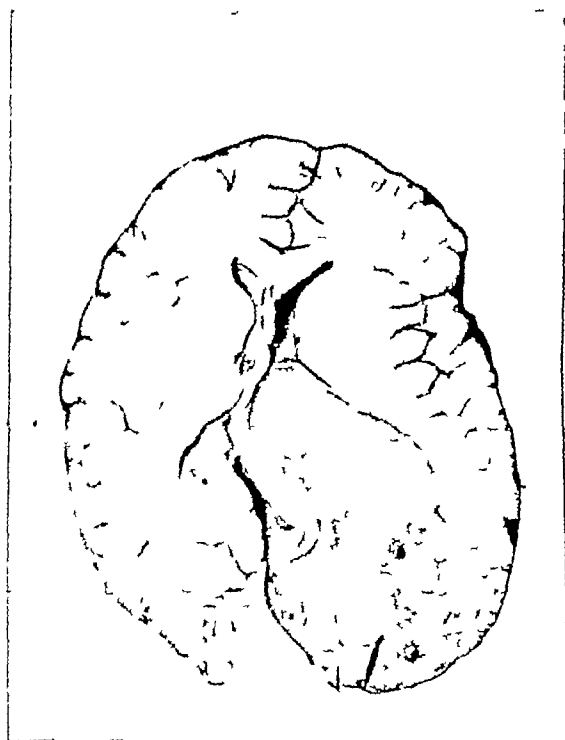
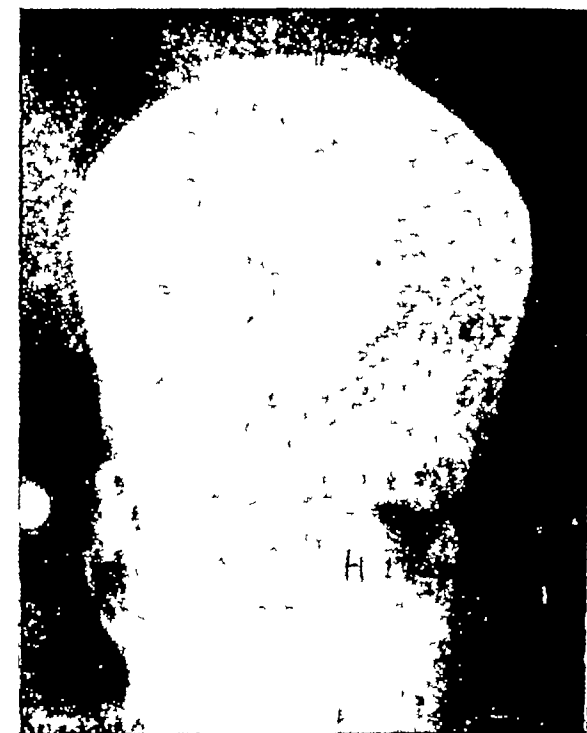


Fig 4

2. It may cause an increase in intra-cranial tension as evidenced by the pulse becoming slow and the respiration slow and difficult. The air injected should be less than the fluid withdrawn (two thirds). Under conditions of increased intra-cranial tension the air should be let out immediately and an injection of 50% glucose 50 c.c. should be given intravenously.

3. The air may cause irritation of the ventricular walls and lead to an



side also. Four X-Ray pictures should be taken, two antero-posterior (frontal up

increase in the secretion of cerebro spinal fluid, and consequent rise in the tension. This will be evidenced by headache, vomiting, slowing of the pulse and respiration. Immediately inject intravenously 50% glucose 50 c c

It is better to proceed with the operation if much time has not been spent in ventriculography to avoid this danger

A table is given below, which gives the a review of 15 cases of cerebral tumours with post-mortem findings. On examination of the table the significance of the various symptoms and the effect on the ventricles will be clear

In one case a tumour situated on the surface has caused a depression on the surface of the brain but no defect in the ventricles, evidently ventriculography could not have been of any help in this case. In two mounted specimens, the ventricles are not preserved. In four specimens the tumour causes obstruction to the circulation of the cerebro spinal fluid and consequent dilatation of the ventricles. In the rest of the specimens the ventricles are obliterated in one part or another. In all these latter cases the tumour has invaded the ventricular wall

In all the above cases, the tumour was not properly localized and

consequently missed. This happened because ventriculography was not in vogue at the time and therefore it was not used. It will be noticed that among the signs there was no localising sign in most of the cases. Papilledema is constant in every case where eyes were examined and was more marked on the affected side. Therefore papilledema is useful to diagnose the SIDE and ventriculography to localize the SITE of a cerebral tumour

SUMMARY.

1 Ventriculography is not only useful but it is essential. It should be used in every case of a cerebral tumour

2 Its main value is for localisation and not for diagnosis

3 It is not always positive. It is positive only when the tumour invades the wall of the ventricle or obstructs the C, S F circulation. When the tumour displaces the ventricle or flattens it out, it does not help in localizing the site

4 It should be done first on the side opposite to the one suspected

5 Air equal to two-thirds of the fluid withdrawn should be injected

6 Ventriculography has got a mortality and it should not be used unless the diagnosis of a tumour is definite

7 Diagnosis of the tumour should be made by papilledema and other signs.



Fig 5

Cylindroma of Pituitary

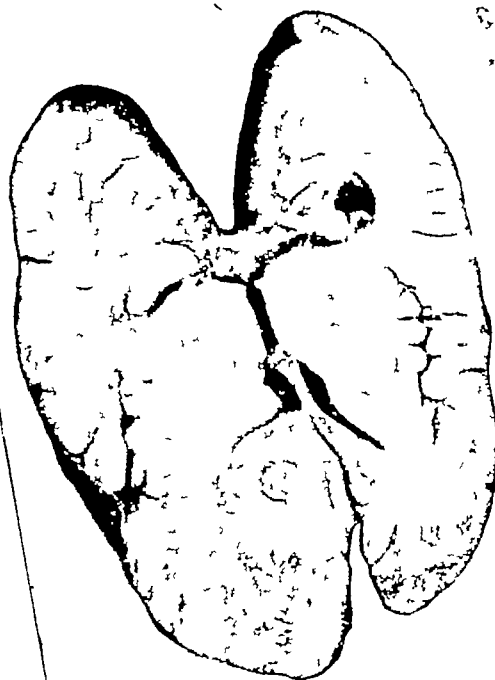


Fig 6

Secondary cancer, left frontal



Fig 7

Tuberculoma, left frontal



Fig 8

Tuberculoma, left temporal

Case No	P M diagnosis	Headache	Vomiting	Papilledema	Loss of vision	Special	Ventricles
1	Glioma left occipital region	+	—	?	++	Right half of body weak	Posterior horn & part of the body of the left ventricle obliterated Fig 4 Corpus callosum pushed up Fig 5
2	Cylindroma of pituitary	—	—	accidentally found	—	Nystagmus	Ventricles dilated & aqueduct dilated Fig 3 Anterior horn of left lateral ventricle obliterated Fig 2
3	Meningioma, posterior end of falx cerebri	+	—	left side present	—	Hemiplegia left side Left VII cranial nerve affected	Ventricle and aqueduct not visible
4	Glioma left frontal	+	—	?	—	—	Posterior horn of ventricle pushed up
5	Glioma of the cerebellum	+	+	++	++	Erosion of occipital bone	No effect on cavities Ventricle displaced
6	Meningioma, occipital region	+	—	++	right +	—	Anterior horn of left ventricle obliterated Fig 6
7	Pituitary tumour	+	—	Cancer not suspected in brain	—	—	No effect on ventricles Fig 1
8	Cancer, left frontal region	Secondary to cancer nose	Accidentally found at the post-mortem examination	—	—	—	Ventricle not shown
9	Meningioma	+	+	++	—	Unconsciousness and rigidity of neck muscles	Aqueduct dilated Cerebrum not shown
10	Glioma, right occipital region	—	—	?	—	—	Ventricles, both dilated
11	Tuberculoma, cerebello-pontine angle	+	+	++	++	Convulsions	Left ventricle obliterated, rt ventricle dilated Fig 7
12	Tuberculoma, cerebellum	—	+	+	++	—	Ventricle flattened
13	Tuberculoma, left frontal region	—	—	—	—	Loss of power on rt side & aphasia	Left ventricle obliterated Fig 8
14	Tuberculoma, left parietal region	—	—	+	++	Convulsions	—
15	Tuberculoma, left temporal	+	+	+	++	—	—

A NOTE ON JUDICIAL AMPUTATIONS AND CRUTCHES FOR CRIPPLES AT ACCHIN (SUMATRA) IN THE MIDDLE OF THE SEVENTEENTH CENTURY

By D V S Reddy, Vizagapatam

All surgeons and especially those engaged in orthopaedic surgery in India will be interested to read a few brief, nay even fragmentary, entries regarding the technique of amputations, post-operative treatment etc, practised in the seventeenth century in the East Indies and preserved for us in the books of travel written by European visitors to the East. Such details are few and far between even in the works of keen observers and voluminous writers. A painting or a sketch of surgical interest is still rarer than the descriptions. Hence, no apology is needed for publishing this note with a sketch. It may stimulate the surgeons themselves to be on the look-out for similar sketches in the works of various authors, little known to the medical profession.

In the course of the description of Acchin, the headquarters of the Queen of Sumatra, in the seventeenth century, Thomas Bowrey, master of a ship carrying cargoes between the various ports in the Bay of Bengal in the years 1669-1679 alludes to the barbarous custom of amputating hands and feet, as a punishment for theft and also to the large number of cripples, so produced by the State. "The laws of the kingdom were very severe in many respects especially for thefts. If a thief be apprehended who has stolen anything to the value of four mace (5 shillings), he is, with all speed carried to the palace and before the chief magistrate and both his hands are cut off at the joints, for the second small crime his feet and upon his committing a third his head." Bowrey adds that those who were thus punished were taken care of, for some time till they were healed and that

these people later turned out begging for their food and drink.

Dampier who made a voyage round the world at the close of the seventeenth century also makes a note of this custom in his book "A thief for his first offence has his right hand chopped off at the wrist, for the second offence off goes the other, and sometimes instead of one of his hands, one or both his feet are cut off and sometimes (though very rarely) both hands and feet."

The actual technique of amputation is not mentioned by Bowrey. Dampier gives the following description, not of the operation but of the manner of dressing the stump. "When a member is thus cut off they have a broad piece of leather or bladder ready to clap on the wound. This is presently applied and bound on fast so that the blood cannot issue forth. By this means, the great flux of blood is stopped, which would else ensue." Alexander Hamilton, another traveller to the East in the first quarter of the eighteenth century supplies some more details. "When their hand or foot is to be cut off they have a block with a broad hatchet fixed in it with the edge upwards on which the limb is laid and struck with a wooden mallet till the amputation is complete and they have a hollow bamboo or Indian cane ready to put the stump in and packed about with rags or moss to keep the blood from coming out." Dampier also adds a statement regarding the results of the operation. "I never heard of any who died of it."

Necessity is the mother of invention. The large number of cripples had to live

somehow or other The State did not take care of them after the wounds were healed Hunger and thirst forced them to move about, like crippled animals But man, the highest of God's creations, has, from primitive days to modern science, used his intellect and imagination to overcome difficulties, disadvantages and deficiencies caused by disease, accident, or by environment or Nature A tone of wonder and admiration may be discerned in the following observation by Bowrey "There be many of them in this City, *Some of them are so ingenious that they can go very well with crutches having a joint of a large bamboe fitted for each leg*" It may be noted here that Bowrey who came from England had also visited many ports and cities of Persia, India and Malay He also had knowledge and experience of other continents If he had seen cripples with crutches moving about in this manner, in England or in other parts of India, there would have been no need for Bowrey to record this special sight at Acchin

And the sight so impressed him that he made a sketch of the cripple with the crutch to illustrate the description he gave That is all he could do in that century with his poor equipment An American millionaire visiting the East today would not hesitate to take a "talkie film" if the sight

had been so rare and interesting as it was to Bowrey



AN ACCHIN CRIPPLE
FROM BOWREY'S TREATISE.
Reproduced by the kind permission of
Hakluyt Society

ACKNOWLEDGMENTS

I am indebted to the Librarian of the Andhra University, Mr S Parthasarathy for the trouble he took in procuring me a copy of the book 'Countries round the Bay of Bengal' by Thomas Bowrey

In 1924 while attached to the G T Hospital Bombay, he had occasion to study intensively a case of dry gangrene in a young man. The case was ultimately proved to be one of Thrombo anginitis obliterans. Previous to this, all such gangrenous limbs were submitted to an amputation. The amputated limbs were just discarded and a diagnosis of dry gangrene was entered in the books of the hospital and was considered to be satisfactory. A further study convinced the speaker that the disease was a fairly common trouble. Hence with the help of the Indian Research Fund Association an intensive study of this subject was undertaken at the K. E. M. Hospital and the present paper was an outcome of such a study extending over three years. He said that he must here appreciate the co-operation of, and thank, his colleagues Drs. Baliga, Munsiff, A. D'Sa and Professor Dhayagude.

This study was based on an investigation of 74 cases.

For purposes of study a fairly comprehensive form was prepared to give an indication of the etiological factors, the early manifestations, the pathology of the disease and its treatment.

The form included a consideration of such ETIOLOGICAL FACTORS as

(1) Sex, (2) Age, (3) Caste and Religion, (4) Residence (5) Profession, (6) Familial incidence, (7) Use of Tobacco and other allied preparations.

THE CLINICAL MANIFESTATIONS were recorded under the following heads —

(1) Pain (2) Wasting (3) Trophic changes (4) Oedema (5) Claudication (6) Surface temperatures (7) Superficial phlebitis

Recognising that this disease was essentially a disease of the peripheral vessels but that it also involved the visceral vessels, a clinical note was kept of (8) Any peculiar abdominal symptoms.

INVESTIGATIONS

(1) Digital palpation (2) Postural tests (3) Noting surface temperature taken with a thermocouple (4) Obtaining tracings of pulsation at different levels with a Tensiograph (5) Arteriography (6) Examination of the fundus of the eye.

THE PATHOLOGY of the disease was studied by

- (1) Microscopic sections of
 - (a) Arteries, (b) Veins (c) Lymphatic glands (d) Sympathetic ganglia (e) Nerves
- (2) Detailed study of the different blood vessels and organs of the body when an autopsy was available
- (3) Cultural examinations of blood and fresh thrombi of excised superficial veins were done
- (4) Blood chemistry was studied by estimation of (a) chloides (b) cholesterol,
- (5) Other examinations such as the Sedimentation rate, Platelet counts etc were done

An attempt was made to assess the value of different lines of treatment —

(a) Buerger's exercises (b) T. A. B. vaccine (c) Hypertonic saline injections (d) Tissue extracts (e) Surgical measures

Without going into details it will be interesting to record the findings during the course of these investigations under different heads.

74 cases were studied. Of these 66 were diagnosed as those of Thrombo ange-

itis obliterans, 1 of leprosy, 3 of syphilis and the remaining of uncertain origin.

SEX

All the cases except two were males. These two female cases could not be included under thrombo angietis. That this is a disease peculiar to the male is now common knowledge.

AGE

The ages of our patients varied from 17 years to 54 years. The majority of our cases ranged between 25 years and 35 years. At the Mayo Clinic the highest age incidence is recorded at about 42 years.

CASTE AND RELIGION

At one time it was believed that the disease was peculiar to the Jew of Polish extraction. However it is now known that this disease has a wide geographical distribution. It is interesting to note that in our series we have not a single Jew. Of the 66 cases studied, 51 were among Hindus, 10 among Mohomedans, 3 Christians, 1 Anglo-indian and 1 Spanish Roman Catholic priest.

PROFESSION

Farmers top the list. Occupations involving a lot of standing such as coolies, salesmen, and mill-hands show a larger incidence of this disease.

FAMILIAL INCIDENCE

In no case could a definite history be obtained to suggest that heredity plays any role in this disease.

TOBACCO

The use of tobacco was found to be very common in the majority of our cases. Only 11 cases stated that they were non-smokers. The others generally smoked 30 to 40 bidies per day. One was a heavy cigarette smoker. Three chewed tobacco. Two were addicted to Charas. One case on admission

showed signs of alcoholic tremens. Tobacco is by no means a primary etiological factor. But it certainly aggravates existing vascular disease. Two cases may be cited. A patient aged 40 years, an anglo-indian, was first examined on 7-1-39. He had claudication for nearly 1 year and had phlebitis about 3 weeks before admission. He used to smoke 30-40 cigarettes a day. His left leg was cyanotic. During his stay in the hospital he received hypertonic saline injections and he was forbidden to smoke. Pain and cyanosis disappeared and he was discharged. He kept well for a month after his discharge. Then one day he smoked 10 cigarettes. He was admitted the next day with intense pain and blueness of the left foot and toes. Hypertonic saline injections failed to give him relief this time. A periaarterial sympathectomy proved futile. Pain increased and he became gradually unconscious and died 2 days later. A post mortem was not available.

Another patient aged 40 years was admitted on 27-9-39 and was under observation for 6 months. Lumbar ganglionectomy did him no good. Saline injections were useless. About 2 months before his discharge it was noticed that he regularly chewed tobacco leaves which he kept concealed in a locker. When this was stopped, saline injections seemed to work. A line of demarcation appeared in the toes and the disease came to a standstill. This indicates that tobacco leaves when chewed seem to retard the progress of healing.

CLINICAL MANIFESTATIONS

PAIN Apart from the pain of intermittent claudication it is useful to note that the pain may be a fixed pain located in one or more of the toes, or the sole of the foot or one or more of the fingers. Sometimes the pain closely simulates sciatica pain. The existence of such a pain requires a careful investigation of the peripheral vascular system. I have

notes of a case of such a nature, a case was diagnosed as sciatica, and was submitted to nerve stretching, resulting in an immediate precipitation of gangrene.

WASTING

A certain amount of wasting is always noticeable in the affected limb. However in a case that came under observation the primary manifestation was marked loss of power simulating a palsy, followed by marked muscular wasting of the whole lower extremity. Under treatment his pain was lessened and the disease appeared to be stationary for some weeks. Then gangrene appeared. Different types of onset have been described by western authorities. There is no mention of an onset of the nature just described. Trophic changes, oedema, claudication, surface temperature and superficial phlebitis do not call for any detailed remarks.

INVOLVEMENT OF VISCERAL VESSELS

Hausner and Allen from the Mayo Clinic report a small series of cases from a total of 500 cases in which there was involvement of coronary, cerebral, pulmonary and abdominal vessels.

In one of our cases the patient had an amputation of one leg performed below the knee followed by an amputation at the thigh. Later he had an amputation of the other leg. Months later he came with acute pain in the thigh & abdomen, distension and marked collapse. He died soon after admission. Post mortem examination showed extensive gangrene of the jejunum and ileum. There was thrombosis in the arteries, but the arteries did not show any evidence of thrombo-arteritis obliterans.

INVESTIGATIONS

In order to estimate the patency or otherwise of the peripheral arteries certain routine investigations are made

(1) Digital palpation is never neglected. The pulsations of the arteries of both the extremities at various levels are noted and recorded.

(2) POSTURAL TESTS. The colour changes in the two extremities, are noted by keeping them first in a dependant position and later in an elevated position. A patient with a probable lesion in one of the lower extremities will show that while resting in bed the colour change is not noticed. If the affected limb is raised and held in that position for a few minutes a distinct pallor appears either in one or more digits or in the whole sole of the foot. The colour changes are still further accentuated by making movements at the ankle-joint. In dark skinned individuals the colour changes are best noticed in the nails. This simple test helps to distinguish a so called "sciatica" of vascular origin.

SURFACE TEMPERATURES The thermocouple was used to determine skin temperatures. The surface temperature electrode was always used. The subcutaneous electrode caused a fair amount of pain. Our readings have failed to give us constant figures. There are several interfering factors. Hence we have not given great importance to these readings. However we have used these temperatures freely to ascertain the amount of vaso spastic element before submitting the cases to a ganglionectomy or sympathectomy. The Vaso motor Index as described by Brown has been routinely used. The surface and mouth temperatures are recorded. Fever is induced by an intravenous injection of T A B vaccine. The readings of surface and mouth temperatures are repeated from time to time during the course of the fever. If the surface temperature of the affected digits increases at least twice that of the mouth temperature, it is concluded that a high degree of vaso-constriction is present, in addition to the

existing arterial disease

When the increase of surface temperatures is 4° or more, an excessive vaso-spasm is believed to exist. In all our cases this increase has been 2° or 3° .

OSCILLOMETRY In our hands the tracings obtained from a recording tensiograph have proved very useful, instructive and interesting. We have obtained tracings of normal individuals for purpose of comparison. We routinely take the tracings of the upper and lower extremities at two or three levels.

We have taken readings of affected limbs when the limb is elevated. We have taken the readings with the extremity in a flexed position. We have obtained readings during claudication and during periods of smoking. Certain interesting features may be pointed out.

In normal healthy young men and women between the ages of 25 and 35 years the tracings showed that the males had a higher amplitude.

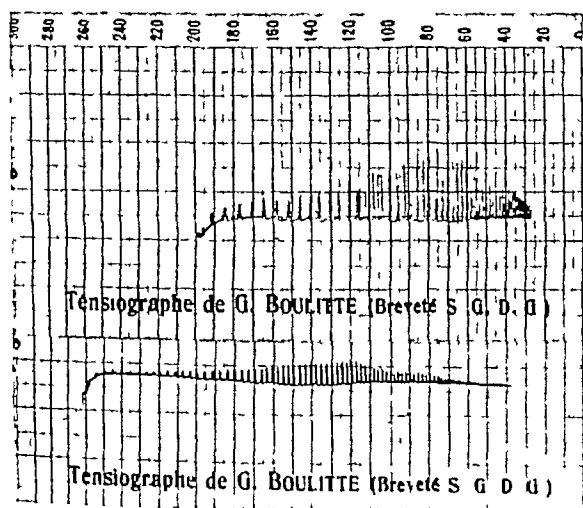


Chart I

The upper tracing is from a healthy male the lower being from a healthy female

The effect of tobacco smoking was studied in normal young men. A progressive vaso constriction as suggested by diminished amplitude of pulsation, was noticed after the smoking of the second cigarette or the third 'bidi'. The maximum constriction occurred after the smoking of the 5th or 6th cigarette and seventh or eighth "bidi".

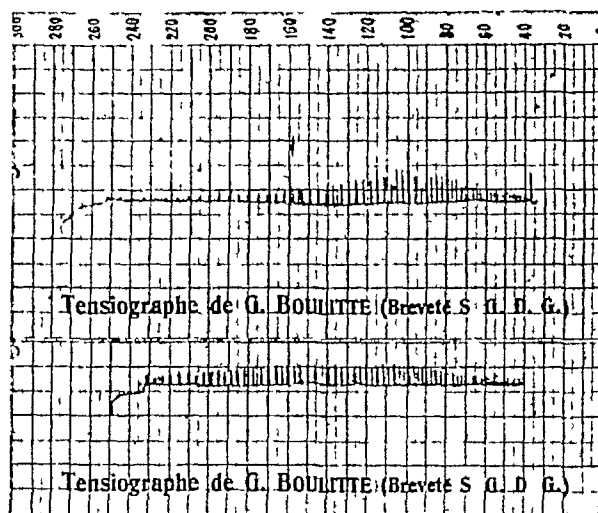


Chart II

Effect of Cigarette smoking on the artery in a healthy person

The upper tracing is before and the lower tracing after smoking four cigarettes

In the light of these tracings it is easy to perceive that in a limb affected with Thrombo-Angelitis Obliterans, the pulsations are just enough to maintain an adequate flow of blood. Smoking a number of cigarettes or bidis at such a critical juncture will cause a vaso constriction so as to cut off the blood supply altogether and precipitate a gangrene of the extremity (See Chart III).

THE INFLUENCE OF POSTURE

In the case of healthy arteries the raising of the leg to an angle of 45° does not change the amplitude of pulsation.

When an affected limb is raised to an angle of 45° there is a diminution in the

amplitude of pulsation after the lapse of about five minutes. Increasing the length of

resulting from such movements at repeated sittings is quite obvious

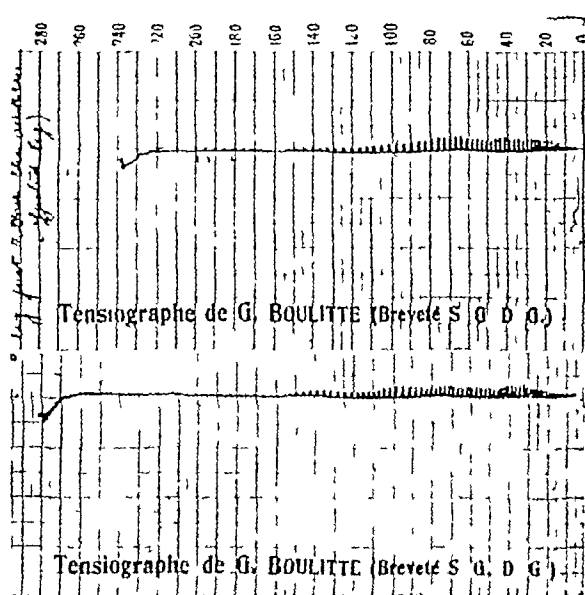


Chart III

Effect of "Bidi" smoking on a Thrombo-angietic artery. The upper tracing is before & the lower after smoking three Bidis

time during which the limb was elevated did not cause any further diminution of the amplitude of pulsation

When the limb was brought to the bed level an immediate rise in the amplitude was noticed. This increase was maintained for periods of from 5 to 10 minutes. (See Chart IV.)

This observation is of great interest as it offers a somewhat rational explanation of the benefit that follows Buerger's postural exercises. When the limb is brought from the elevated position to the bed-level there is a phase during which the amplitude of the pulsations are increased for an appreciable length of time. During such a period necessarily there is an increased flow of blood through the extremity with its attendant advantages—better nourishment and a greater opening out of the collateral circulation. The advantages

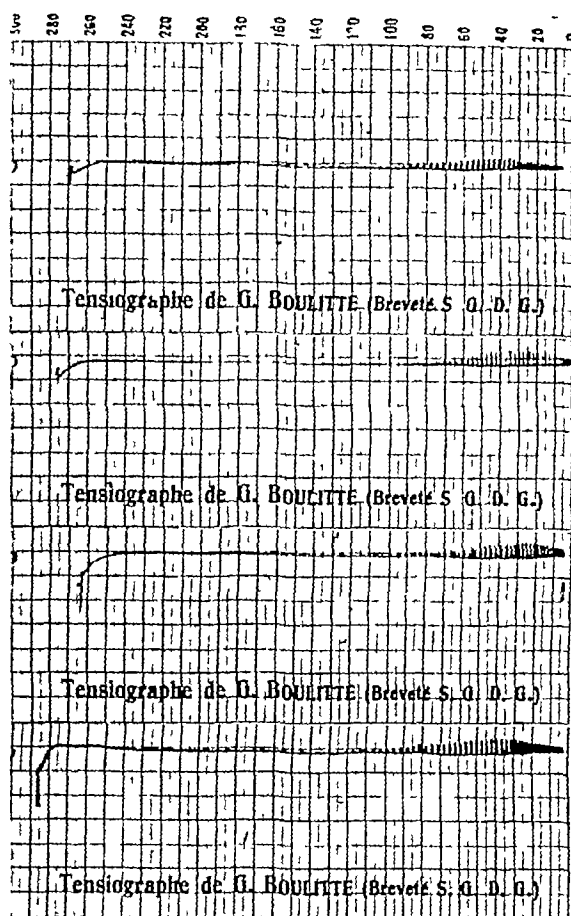


Chart IV

To show the effect of posture on Thrombo-angietic artery. The tracings were taken as follows:
Uppermost—with the limb level
Second—with the knee flexed to 45°
Third—with the extended limb elevated to 45°
Lowermost—with the limb brought level after elevation

It may be stated that the increase in amplitude may well be accepted as a criterion of the benefit derived from any remedial measure. Thus the injection of hypertonic saline or T A B vaccine produces a definite increase in the amplitude of pulsations for varying periods of time. (See Chart V.)

CLAUDICATION

Tracings were taken with the patient standing up. He was made to walk until

the pain of claudication appeared. Tracings were taken again. It showed that during

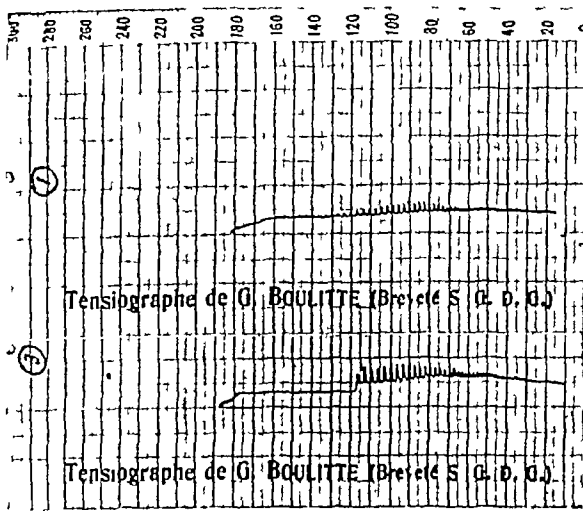


Chart V

To show effect of 4% saline on a T A O artery. The upper tracing is before & the lower one 15 minutes after intravenous injection of 250 c c of 4% saline.

the period of pain there is an actual increase in the amplitude of pulsation. (See Chart VI)

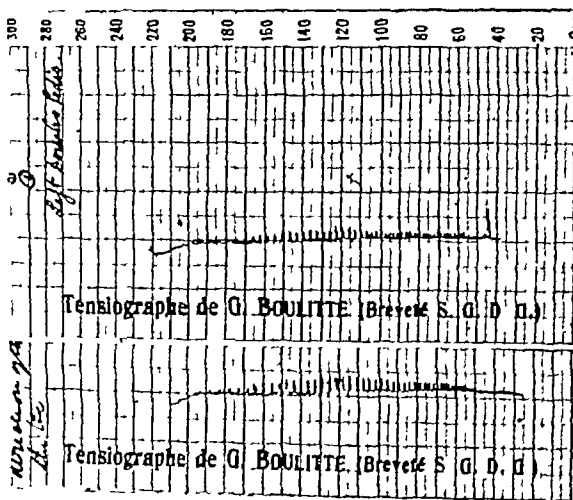


Chart VI

To show the effect of movement of the limb on T A O artery. The upper tracing is before & the lower one after movement.

These observations throw some light on the nature of the pain.

As a normal artery pulsates, the arterial walls collapse and distend alternately.

These movements of the arterial walls are recorded by the oscillometer. The extent to which an artery can collapse and distend depends on several factors such as the state of the arterial walls, posture, the volume of blood brought in with each systole and the rapidity with which this volume passes out.

In a normal artery the blood within it is at a certain tension. If for some reason there is an increased flow of blood the walls of the artery distend or open out a little further to accommodate this extra amount of blood. The tension within the artery does not rise under these circumstances. But in thrombo angitis obliterans the arterial walls are thickened and are less elastic. They are therefore incapable of expanding to accommodate this extra amount of blood and therefore tension within the artery rises. This increased tension causes pain. A similar state of affairs is noticed in the cystic duct. When the duct is blocked the tension within the duct and gall bladder rises. When the tension is increased to a certain level, pain ensues. Thus it appeared to him that the pain of claudication was the result of increased tension within the artery. Further colour is lent to this supposition by the fact that the pain of claudication is relieved as soon as the patient sits down. The diseased walls cannot open out readily and they open out still less when the artery is put on the stretch, while the patient is standing up. When he sits down, the artery is relaxed and the walls permit of a little distension so that the tension within the artery lessens.

In this connection it is interesting to note that even in a T A O artery a distinct increase in amplitude of pulsation is noticed when the limb is flexed (See chart IV). This increase in pulsation is due to the fact that during extension the artery is put on the stretch and permits distension of its walls up to a limited degree. Flex the limb and the

artery is relaxed and the same volume of blood causes a greater distention of the wall

It is again noteworthy that many of our patients found relief from pain when the limbs were kept in a flexed position and preferred to lie in bed in such a position

EFFECT OF PASSIVE CONGESTION

A tourniquet was applied at the lower third of the thigh and tracings recorded at ankle level. Different pressures were applied. At varying pressures oscillograms were taken with observations on the increase, decrease or disappearance of pain. It was observed uniformly that at certain pressures, specific for each patient, there was a maximum amplitude and also a simultaneous relief of pain. Thus in a specific case where pain was present in the limb, on increasing the pressure to 10 mm of Hg no change was observed in the amplitude and the pain continued. When the pressure was raised to 30 mm of Hg pain disappeared with maximum amplitude. As the pressure was raised from 30 to 80 mm the patient remained free from pain but the amplitude of pulsation was less than at 30 mm of Hg. When pressure was raised to 100 mm of Hg pain appeared and at 150 mm pain became unbearable. (See chart VII)

In two cases treatment by intermittent passive congestion was tried without any good results

ARTERIOGRAPHY was attempted with the use of Uroselectan and with per-abrodil. In our hands Arteriography proved to be of a very limited value. The resulting skiagrams were greatly admired by friends, but we doubted the wisdom of employing this method for routine work, particularly as in one case it actually precipitated gangrene and in another case caused oedema. We read an article in the Indian Medical Gazette where an Austrian

surgeon recommended the use of per-abrodil not only as a diagnostic but also as a therapeutic measure in cases of thromboangeitis obliterans. We fail to support his contention. A normal arteriogram shows that the lumen of a vessel remains the same and the margins are extremely razor-sharp. The number of collaterals shown in a normal arteriogram are few. In

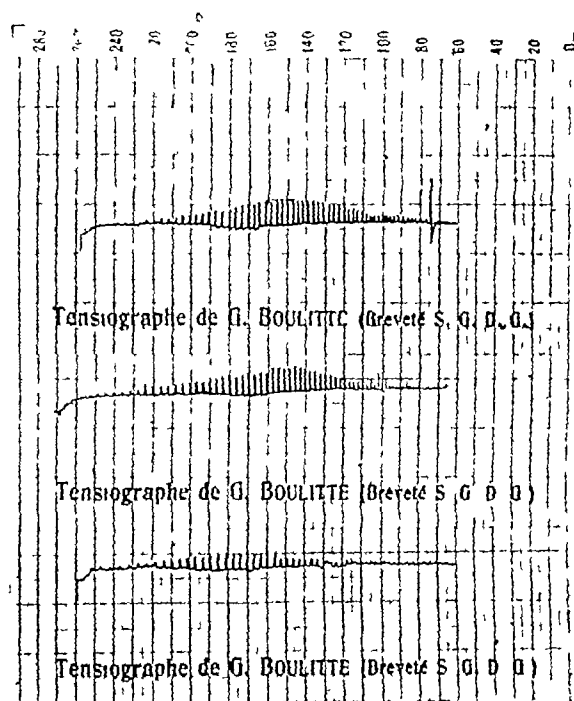


Chart VII

To show the effect of Passive congestion on amplitude in TAO artery

The uppermost tracing was taken with the tourniquet at 40 mm pressure, the middle one at 90 mm & the lowermost at 110 mm of Hg

a case of thromboangeitis the lumen changes in size where the vessel is diseased. The changes in the lumen vary from a small diminution to complete obliteration. In the area where the lumen is altered the razor-sharp outline is lost. Again distal to the obstruction a much greater number of collaterals are demonstrated.

OPHTHALMOSCOPIC EXAMINATION

Dr. S. N. Cooper D. O. (Oxon), made a routine examination of the fundi. It was

hoped that early arterial changes may be detected here. However in no case was a genuine lesion demonstrated.

PATHOLOGY

Histological section of blood-vessels, nerves, glands and sympathetic ganglia obtained during or after an operation, were done in all cases available for such procedures. Post-mortem examinations were carried out in three cases with special reference to the peripheral and visceral vessels and to various internal organs.

The pathological changes both macroscopic and microscopic have been so well described by Buerger that it would be a waste of time to enter into any detailed description here.

In one of the autopsies there was definite evidence of the involvement of some of the abdominal visceral arteries. However, in this patient, during life, there were no abdominal symptoms present to warrant such an assumption.

In another case changes both of arteriosclerosis and thrombo-angietis obliterans were detected. This case has already been referred to in an earlier part of this paper.

During the course of Lumbar ganglionectomies it was noticed that the lumbar lymphatic glands were enlarged. It was hoped that some clue may be obtained by obtaining cultures from these glands. Results so far are negative. Histologically, the glands showed an increase in the amount of reticular tissue, both in the cortex and in the medulla.

In one of our cases the routine examination of the nerves showed the presence of a nodule of leprosy.

The histological studies of arteries and veins suggest an inflammatory origin. Gram negative bacilli were isolated from the blood

of Thrombo-Angietic patients by Rabnowitz, while Gram positive pleomorphic streptococci were grown from phlebotic patches and blood at the Mayo Clinic. Our bacteriological examinations of the blood and of excised veins in cases of superficial phlebitis have given us negative results.

Buerger was able to produce pathological lesions in man by implantation of resected inflamed superficial veins. Allen and Lauderdale report a case of accidental transmission to a surgeon. This is an intriguing line of investigation.

On the assumption that the disease may be the result of a virus infection an attempt was made to obtain an antigen on lines similar to Frei's cutaneous reaction in cases of lympho granuloma inguinale. Excised portions of phlebotic veins were used for the purpose. Our results have been negative so far.

A study of the pathology enables one to give a rational explanation of the arrest that occurs during the course of the disease. Generally speaking this is a progressive disease with periods of regression.

The patency of the vessel is destroyed by the thrombus. The nutrition of the limb depends on the efficiency of the collateral circulation. This is further helped by a partial restoration of the lumen through the agency of canalization that occurs in the thrombus. Because of these changes, there appear to be periods of regression and even spontaneous cure. If this fundamental fact is remembered, one is inclined to take a very sceptical view of any therapeutic measure, medical or surgical, that may appear as a cure of this disease which, unfortunately, still remains unconquered.

BIOCHEMICAL INVESTIGATIONS

Judging from the beneficial effects of hypertonic saline we decided to estimate

the blood chlorides and the daily excretion of chlorides in the urine. A majority of the cases showed a slight diminution in blood chloride but the daily excretion was normal. In a few cases the diminution in blood chloride was marked.

In all cases blood cholesterol was observed to be slightly low and the sedimentation rate rapid. This is what one would expect in a lesion which is likely to have an infective origin.

DIAGNOSIS

Usually it is not difficult to differentiate this disease from other circulatory diseases of the extremities. The presence of a cervical rib in a thrombo-angietic patient with manifestations in the upper extremity raises a rather delicate problem from the point of view of surgical treatment.

THERAPEUTIC MEASURES

These may be divided into prophylactic, medical, mechanical and surgical.

PROPHYLACTIC The patient is taught the technique of Buerger's remedial exercises. He is instructed to avoid any type of injury to his toes such as exposure to cold, or the rubbing in of a liniment or the wearing of tight shoes.

MEDICAL. The remedies can be classified into three groups. — drugs which are bactericidal — drugs that produce vaso-dilatation and drugs of hormonal origin. To this may be added T A B vaccine.

Sulphanilamide preparations in our hands have proved futile.

Padutin, Angioxyl, Acetyl-choline have failed to give results.

Injectations of T A B vaccine have been greatly extolled by the workers at the Mayo clinic. We however have a preference for

hypertonic saline injections. We generally use a 4% solution and inject about 300 c c every fourth day. If after the fourth injection pain is not relieved we increase the strength to 5% before giving it up. These injections seldom fail to give relief from pain. They also seem to arrest the progress of the disease and help towards the development of a line of demarcation when gangrene has set in. Taking tracings with the oscillometer it was found that after these injections the amplitude was appreciably increased for about half an hour. (See Chart V.) These injections are also supposed to diminish the viscosity of blood which is said to be increased in this disease.

Hormonal preparations have not yet been tried by us.

MECHANICAL Buerger's postural exercises do not require a lengthy description. They are well known. We find that these exercises constitute the most important part of any treatment particularly in the early stages.

Mechanical beds with a motor-drive have been constructed which ensure the performance of Buerger's exercises even when the patient is asleep. These beds are marvels of precision and are noiseless, these beds are naturally beyond our slender means.

Mechanical treatment employing intermittent passive hyperemia was tried but did not relieve the patients. This requires an intelligent co-operation from the patient. This is seldom forthcoming. The pneumatic cuff of a sphygmo-manometer was applied to the proximal end of the extremity and a pressure produced which gave relief from pain to the patient. This pressure varied between 30 and 70 mm of Hg. The pressure was maintained for three minutes.

to be reapplied after an interval of another three minutes

We have not had the opportunity of trying the effects of the Pavaex machine which employs a glass-boot in which a positive and a negative pressure can be produced in an alternating manner. Dr. Samuels attached to the department of peripheral vascular diseases of the Bellevue hospital, New York, in a personal talk stated that the results were not at all encouraging.

SURGERY Surgical measures include ligation of the femoral vein, periarterial sympathectomy, ganglionectomy, and amputations.

We have seen no benefit from simple ligation of the veins.

At one time arterial sympathectomy and ganglionectomy were considered to be a big advance in the therapy of this disease. In our series, lumbar ganglionectomy was done in eight cases and cervical ganglionectomy in one case. Five of these cases needed higher amputations at varying lengths of time from the performance of the operation. The time varied from weeks to years. Three cases died as the result of the operation. This is a high mortality rate. Two of the deaths occurred from pulmonary

oedema. Periarterial sympathectomy was done in 8 cases. In two cases the pain was aggravated. No case obtained any relief. The study of the relapsed cases shakes our faith in the permanency of the results obtained by surgical measures.

Nineteen cases underwent amputations, when the amputation was done high the wound healed by first intention. Only in two cases the flaps did not unite. Intravenous hypertonic saline at this stage is distinctly beneficial.

The disease may end spontaneously. However, in the majority of cases the disease is progressive and multiple amputations are not uncommon.

Our investigations still continue. Injections of nicotine and biopsy material into monkeys are being carried out. Transplantations of diseased arteries into animals is being tried.

The value of hormonal therapy is yet to be estimated.

The whole problem is at present like a jigsaw puzzle and demands a more prolonged investigation to see how the different pieces fit into the final picture of this very complicated disease.

A DISCUSSION FOLLOWED —

DR M. R. CHOLKAR said: "I have treated 3 cases and seen one in all 4 cases at the Mayo Hospital, Nagpur, three of which were 'Mahar' (Depressed class) by caste and the fourth case was that of a forest ranger. All these four people were taking a lot of alcohol. The three people were of the poor class and the forest ranger was not so poor. We tried all the methods short of lumbar ganglionectomy such as exercises and injections. When we told them of the exercises they laughed—because they had come

to the hospital with a view to taking injection. We could not induce them to stay for a long time. The forest ranger had gangrene of both the legs and amputation was performed in the middle of the thigh and he subsequently died."

Dr. KINI said that he had only two cases of thrombo-angitis obliterans and in both the cases it occurred in males of the age of 30. In one case first one limb was amputated for well established gangrene and later when he came with definite signs of commencing

gangrene of the other foot, exploration of his femoral vessels in the femoral triangle showed oedematous infiltration in the sheath of the artery and slightly outside it showing thereby that with the end arteritis there was per arteritis as well. He showed the two clinical pictures on the screen showing the type of the gangrene for which amputation was the only method of treatment and the vessels on section showed marked end arteritis obliterans.

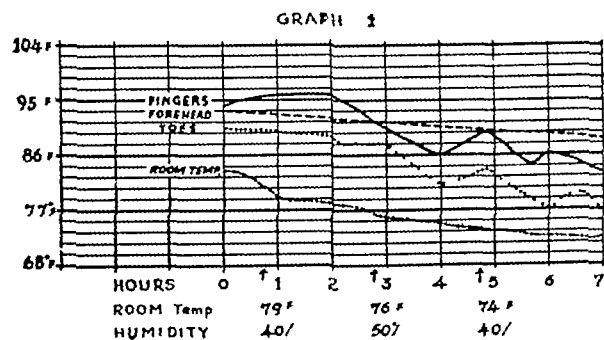
Col M M CRUICKSHANK, I M S dealing with the investigation of superficial skin temperatures by means of thermocouples and Mark's clinical thermometers pointed out that it was necessary to appreciate what a normal graph looked like.

The body adjusts itself to low environmental temperatures by vaso-constriction and to high environmental temperatures by vaso dilatation of peripheral vessels.

Further in the elimination of heat different parts of the body play different roles, but the fingers and toes are the most delicate and sensitive indicators of changes in vaso motor tone.

Again, factors such as the basal metabolic rate, movement of air, position of patient, humidity etc, being kept constant, varying room temperatures will effect the extremities in varying degrees.

Graph 1 shows how the superficial skin temperatures of the forehead, finger

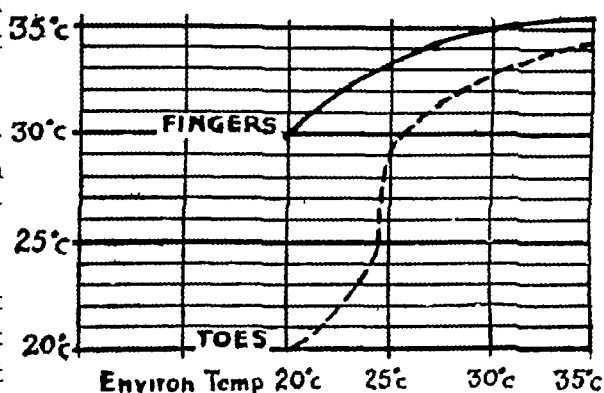


and toes behave in an air temperature varying from 79° F to 74° F with a humidity of 40% to 50%.

The skin temperature of the forehead which represents the body generally, is seen to lie in the region of 93°F, while that of fingers and toes shows a gradient, the fall in the temperature of the toes being more marked, finally reaching almost that of room temperature.

Graph 2 shows how the skin temperatures vary with varying environmental temperatures.

GRAPH 2



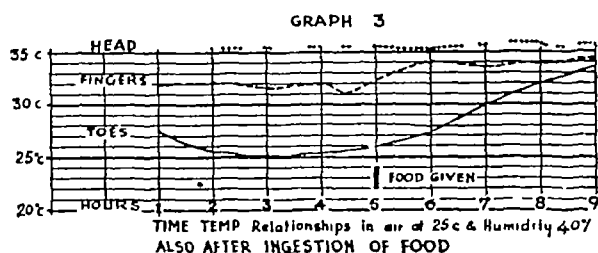
In a low atmospheric temperature say 20°C, the temperature of the toes is in the region of room temperature while that of the fingers is raised, showing some degree of vaso dilatation. As the room temperature rises to 25°C the temperature of the toes rises above room temperature while the temperature of the fingers rises to 33°C, indicative of almost maximal vaso dilatation.

Raise the room temperature to 35°C and the temperature of the toes will rise rapidly to that of the fingers in the region of 34°C to 35°C, that is, in a state of maximal vaso-dilatation.

That is, the temperature of the toes finally reaches a temperature comparable with that of the fingers. Above an environ-

mental temperature of 35°C , the regulation of heat dissipation is brought about by the secretion of sweat and by evaporation

One notes, therefore, that as the air temperature rises the regulatory mechanism is a function of the fingers, the toes conserving heat. At first when the air temperature rises beyond 30°C , the toes as it were tune in to help the fingers in the dissipation of the heat produced in the body. This regulatory mechanism is seen in Graph 3 where heat has been produced in the body by the simple expedient of giving a standard meal.



The same graph would result, had the patient's trunk been encased in a chamber and the air in the chamber rapidly heated to 60°C .

One can, therefore, appreciate how abnormal it would be for the fingers to register a superficial skin temperature of 32°C in a cool room or a skin temperature of 25°C in a warm room.

In evaluating skin temperature in cases of Raynaud's or Buerger's disease, it is necessary to raise the environmental temperature to much a degree that maximal vasodilatation of vessels in fingers and toes will be produced, if it is possible to produce vasodilatation at all.

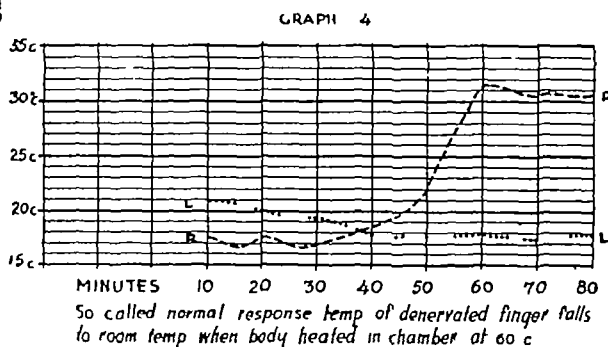
A blanket test, which will raise the air temperature around the body under the blanket to about 86°F may not be sufficient. The best methods of raising body heat production is by placing the patient in a chamber which can be heated to 60°C or by giving him an injection of T A B vaccine.

The point I wish to make is, that if the presence of vaso spasm is to be demonstrated, then one must aim at producing maximal vaso dilatation. If this is not done, then cases of Raynaud's and of Buerger's disease will be missed or wrongly diagnosed.

To deal with one or two points where our findings do not agree with those of other writers.

It is said that there is no subject or disease in which the fingers fail to vasodilate, unless a sympathectomy has been done or the vessels are obliterated.

Further that denervated fingers and toes remain at room temperature when the body temperature is raised, Graph 4.



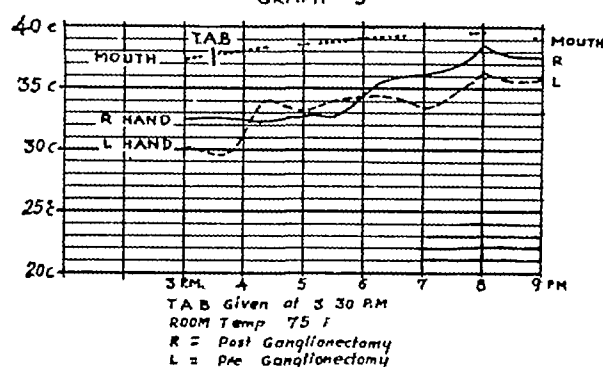
A reference to Graphs 5, 6, 7 will show that in all our cases where a sympathectomy has been done, there is evidence of vasodilatation when the body heat is increased, and in no case do the fingers and toes of the denervated limbs remain at room temperature.

One might say that warming the body or increasing heat production in the body removes some of the vaso-constrictor tone, while what remains, or part of what remains of vaso-spasm after warming is removed by a sympathectomy.

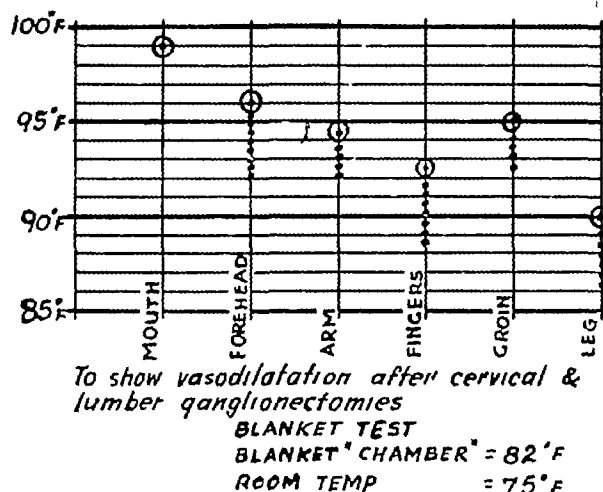
This release of vaso-constrictor tone after ganglionectomy, is brought out more definitely after an injection of T A B.

vaccine With the blanket test, the temperature around the body under the blanket seldom rises beyond 86°F which is not sufficient to produce maximal vaso dilatation

GRAPH 5

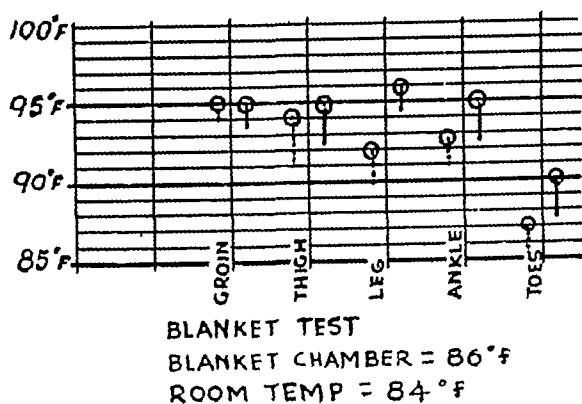


GRAPH 6



GRAPH 7

To compare vasodilatation before & after 9 lumbar ganglionectomy



When after ganglionectomy the temperature of the body is raised by means of the heated chamber or by means of the blanket test, the vaso dilatation of the fingers is in the region of 33°C to 35°C , that is maximal vaso-dilatation whereas, when the body temperature is raised by injecting T. A B vaccine, the temperature of the fingers may rise, though not always so, to 37°C , i e, to blood heat. This does not apply in the same degree to the toes but the toes also show same degree of vaso dilatation after ganglionectomy when body temperature is raised

The question of whether a pre or a post-ganglionectomy is the better operation remains in doubt

If however, the absence of vaso-dilatation after ganglionectomy is to be accepted as a criterion of a successful operation then in my cases neither the pre nor the post ganglionectomy is of value See Graph 5

If, on the other hand, one accepts the indications of graphs, then there is nothing to choose between the two operations

The patient himself says that he feels that the operation on the right arm, a post-ganglionectomy operation, has given a slightly better result in that his right hand always feels slightly warmer than his left

Mr Cooper has spoken of the economic disability Can we say that operative treatment has in any way lightened this disability for the patient?

One can say that a ganglionectomy will postpone the day when partial amputations will be required For how long that postponement will be, will depend upon how soon the case is brought for operation

When pain is a feature of peripheral vascular disease, the effect of a ganglionectomy is dramatic.

Others have mentioned a high operative mortality rate which surprises me, because our operative mortality has so far been nil. There is no doubt, however, that in the very early cases operative treatment is not called for and the evil effects of the condition can be postponed if the patient will realise that he has a disease of his blood vessels and that in the majority of cases good treatment, avoiding injury to and care of the feet, and education of the patient concerning his disease and its hazards will enable him to avoid disabling pain and gangrene.

As in all conditions affecting the cardiovascular system as in most other diseases, the patient must make up his mind to live within his limitations.

Dr C RAGHAVACHARI, said "We find that the incidence here in Madras is very much less than what Mr. Cooper has said obtained in Bombay. In 2 years we had 4 cases in all. Two had been operated elsewhere for thrombo-angeitis obliterans and presented as failures of ganglionectomy. Besides these there were only two new cases of thrombo-angeitis.

Apart from these there were one or two early suspected cases whom we asked to come in and have the condition investigated and treated. But they refused to come in. The patients cannot be expected to be thrombo-angeitis conscious to the same extent as we are. I should consider that apart from that, incidence of the disease is also low in these parts.

The incidence in this country seems to be more among non smokers. Evidently there are two forms of disease, one occurring in non smokers and the other in smokers. The latter is the benign type and the former the malignant. Smoking has only an aggravating influence. I wonder if Mr Cooper agrees with the above view found in the literature.

I have personal knowledge of two cases which were admitted into our wards, cases of thrombo-angeitis obliterans showing gangrenous ulcers in the toes. They were suffering from severe pain and it was easy to make them submit to operative treatment. There was first a course of saline injections, in both the cases. We did not use the usual method of approach to the trunk. We submitted them to a bilateral ganglionectomy though the manifestations were unilateral. In the first case the approach was transperitoneal. We made two incisions one on the side of the inferior vena cava and one on the side of the aorta. The ganglionectomy on the left was attended with difficulty due to the inferior mesenteric artery. The result was very good and the patient went home completely satisfied with the treatment. In the other case we followed another technique in doing a bilateral denervation. We made a section of the trunk cranial to the 4th lumbar ganglion."

Dr BAHADUR KHAN, Hyderabad (Dn) said "During the last year three cases were admitted to my wards. One was an elderly man with an advanced gangrene of the foot. It had to be amputated as no other line of treatment appeared to be of any avail. The other two were about 35 years of age. One of them is under my treatment at present. He had gangrene of the big toe some three months ago, which had been amputated and took a long time to heal. That was done by some body else. He came to me with a gangrenous slough on the second toe. The slough is mostly on the inferior aspect and half of the toe has disappeared. The third toe is now becoming bluish and rather inflamed. He complains of severe burning pain in these toes which aggravates at night. I am persuading him to submit to sympathectomy.

The other patient who was admitted before had an ulcerated big toe.

with a gangrenous slough. He also complained of severe pain in the toe as well as in the leg. The pain in the leg was of the character of cramp. It used to get worse at night so much so that he was boisterous and disturbed other patients. Many times he attempted suicide. I did all I could conservatively to relieve the pain but did not succeed. He refused any operative interference. The toe did not heal. He left the hospital and I have not seen him since. Both these patients had a history of intermittent claudication of a few years duration.

Dr. N. S. NARASIMHAN, said — "My first case of thrombo angitis in the Madras General Hospital was in a man aged 45, a butler by occupation, and was detected in December 1934 and an extraperitoneal lumbar ganglionectomy was performed in 1935. The patient developed gangrene and an amputation below the knee had to be done.

Subsequently he developed gangrene of the opposite lower limb and died in June. The specimens shown here show the extensive thrombosis in the arteries seen at the autopsy.

Peripheral vascular disease is not rare in Madras and one may be missing early cases. The cases seen amongst Indians in this hospital are from the poorer classes but the cases amongst the Europeans are from the higher ranks.

The early signs and symptoms of chilliness of the feet, blanching, flat foot and abdominal symptoms have to be remembered, ulcers, blisters, sclero-dermia, onychia of big toe indicate that structural changes in the arteries are present. The patients may travel from one speciality to the other. Gangrene would always indicate vascular obstruction.

There had been no deaths after lumbar ganglionectomy in this hospital. The advan-

tage of a ganglionectomy is relief of pain and that a below-knee amputation could be performed. Ganglionectomy is of definite value in the rest-pain stage but not when intermittent claudication is present.

Intermittent claudication may occur in severe anaemia and is then curable.

Thrombo angitis obliterans is reported in horses and consequently smoking may not be the important factor in the causation of the disease. I request that any available information on this disease in the horses may be communicated.

Glass boots (Pavaex) are used in the Mayo clinic. The glass boot is reported as useless in thrombo angitis obliterans. It is reported as most valuable in saving limbs after embolism. This is because the arteries except the blocked one are normal.

Intermittent venous obstruction is of some value in thrombo angitis cases.

I know the whole history of a thrombo angitis case in a European aged about 55. He has had paroxysmal attacks of pain in his foot once in 6 months or so. He has had an appendicectomy done 8 years previously. He used to attribute the pain in the foot to an old disease of the navicular supposed to be tuberculous when he was a youngster. A mould of the foot was taken to make a Whitman brace, foot pain is a genuine symptom and all cases of the foot pain in my department are carefully investigated. Subsequently he developed gastric ulcer symptoms for which he was treated medically. It was during the course of investigation for the gastric symptoms, that the real condition was diagnosed. No calcification of arteries was noted in the radiogram. 300 injections of myosin, application of radiant heat, warm climate had been of no use. He underwent bilateral ganglionectomy, and subsequently both the limbs had to be

amputated, a lower level amputation was the advantage gained, dissection of the foot showed an abscess cavity in the navicular bone from which "Streptococcus pyogenes" was grown. Gastric symptoms of bleeding from ulcer did not stop after ganglionectomy but showed itself now and then, he died of cardiac symptoms.

Exhibition of gastric symptoms lead me to investigate fractional gastric analysis in one man on whom a bilateral ganglionectomy had been done, there was an initial high free and total acidity, followed by a very sharp rise from $3/4$ to $1 3/4$ hours, then a slight fall and a steep rise at the end of two hours.

In another case where a young man had his four limbs affected the fractional gastric analysis showed a subnormal acid curve. The man ran away without getting ganglionectomy done and further observations could not be made.

Two cases with gangrene of the tips of fingers and severe pain in the upper limb were seen. A cervico-dorsal ganglionectomy by the posterior route was performed in one case in May 1939 by me, the man died of cardiac symptoms on the 3rd day after operation.

Migrating phlebitis is common in the course of this disease, but the clinical signs of phlebitis cannot be differentiated from those of the accompanying thrombosis. These cases may easily be passed over in a busy outpatient department especially here where one meets with a large number of cases of lymphangitis. The early recognition of the disease is important.

The disease is not reported in women, other types of peripheral vascular disturbances as Raynaud's are common in wo-

men, rheumatoid arthritis is very common in women, although said to be infective in origin, no infinite focus has been noticed in my 7 cases (Madras Medical College Magazine July 1939-No 4-Vol XVIII). A bilateral lumbar ganglionectomy by the abdominal route was performed and there was relief of pain in all cases in the upper extremity joints as well.

There may be in these cases some common factor which has to be looked for.

The President, Col Pandalai, I M S concluding said

Ladies and Gentlemen,

I feel sure that you would like me to thank Dr Cooper for his masterly study of thrombo-angitis obliterans which although not a common disease is still far from rare in India. It would be found to be much more common than we now think if we pay attention to foot and finger pains. The cause of the disease is unknown and its pathology uncertain. The diagnosis in advanced cases is fairly easy but its treatment is entirely empirical. We have all tried various drugs, injections, radio-therapy and latterly we are trying surgery on the sympathetic system, towards the relief of this condition with uncertain success as mentioned already.

Sympathetic surgery is a comparatively new field of surgical research and as usually happens when a new field is opened up everybody tries it for the relief of many hitherto incurable conditions. For the relief of essential hypertension, a great deal of surgical work on the sympathetic system is going on in many parts of the world. Dr Crile of Cleveland to whom Dr Cooper has referred in his paper has accumulated large figures of his operations through the loin for the removal of the semilunar ganglion in cases of high blood pressure. He does

not see the ganglion but removes it by the sense of touch through a small incision with the help of special instruments which he has devised. He claims considerable improvement in at least half his cases,

As regards relief of sequelae of thrombo-angitis obliterans by sympathetic surgery I am afraid we cannot feel happy. The disease requires a great deal more study and let us hope that we in India, where the disease is being more frequently diagnosed may be able to contribute something to the solution of this problem.

Our scientific discussions are now over for this session and you will agree with me that we have had a strenuous three days. I have a feeling that we have in these 3 days tried to do too much and with your approval, I shall suggest to the Governing Body to consider whether they could not lighten our labours by reducing the number of subjects for discussion by one for future sessions. They will no doubt do what they can in consultation with the readers of papers who have consented to open discussions in the 1941 session.

देशेऽल्पमांसे सन्धौ च सूची वृत्ताऽङ्गुलद्वयम् ॥
 आयता त्र्यङ्गुला त्र्यस्रा मांसले चाऽपि पूजिता ॥ २३ ॥
 धनुर्वक्रा हिता मर्मफलकोशोदरोपरि ॥
 इत्येतास्त्रिविधाः सूचीस्तीक्ष्णाग्राः सुसमाहिताः ॥ २४ ॥
 कारयेन्मालतीपुष्पवृन्ताग्रपरिमण्डलाः ॥
 नातिदूरे निकृष्टे वा सूचीं कर्माणि पातयेत् ॥ २५ ॥
 दुराद्रुजो व्रणौष्ठस्य सन्निकृष्टेऽवलुञ्चनम् ॥ २६ ॥

—सुश्रुत व्याख्यायां सूत्रस्थाने पञ्चविंशतितमोऽध्यायः

In regions which are not fleshy or tough and near joints the needles should be rounded and about two inches long. It is recommended to depend on a needle three inches long with three sides in fleshy or tough regions. A needle bent like a bow is useful in (sewing) vital parts, the scrotum and the abdomen. These are the three varieties of needles and they should all be with sharp points and easy to hold. They should have rounded stems like the stem of a Jasmine flower. When using needles, the needle should be entered neither too far nor too near the wound edges, if introduced too far away the stitch causes pain, if too near the stitch cuts through.

—Sushruta Samhita, Sutrasthana,
 25th chapter, 23-26 verses.

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[No. 3

EDITORIAL

We have pleasure in presenting to our members the third Number of this year

We are grateful to Mr Menon, Mr Rao & Mr Narayanamurti for the interesting case report of a case of Arrhenoblastoma and the discussion thereon. One of us remembers a case at the Chelsea Hospital for women in London, under the care of Mr Bright Banister, who had a hirsute upper lip and coarsening of the features. A hard nodular fibrous tumour of the right ovary was found at operation.

Mr N S Narasimhan's paper on small pox lesions of bones and joints is very interesting and illuminating.

Mr Kini has sent two observations regarding injuries to the elbow, which are complementary to each other. He has made line drawings, which are faithful reproductions, from X-Ray plates. The X-Ray pictures were also submitted to us but as Mr Kini wished to emphasise certain

features, and as the line drawings have helped him to bring out these features, we have published the line drawings.

The quotation from Sushruta in this number shows that he knew all about the round bodied, the triangular and the curved needles. He also lays down where to use which. When one remembers that one believed that the head and jaws of the Soldier Ant were used as a sort of Michel clip for approximating the wound edges in Ayurveda, one is pleasantly surprised to find that the main forms of needles now in use, were known and used two thousand years ago. It is a pity that no instrument catalogue of that period, like those of the leading Surgical instrument makers to day is available.

We appeal again to the members to send in more case reports and comments, as well as papers on subjects they are interested in.

ARRHENOBLASTOMA OF THE OVARY

(A clinical-pathological study with a case report)

By

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INTRODUCTION

Neoplasms of the ovary associated with secondary changes in sex characteristics have received greater attention in recent years especially since Mayer (1930) presented considerations regarding their probable origin from an ontogenic point of view. He designated a particular histological type of masculinising tumour of the ovary as Arrhenoblastoma, on account of the male directed (Arrhenos male) nature of the cells giving rise to the tumour, whether or not they produced male secondary characteristics. The earlier cases of this variety of tumour had either been called tubular testicular adenomas (Pick, 1905 Schickele, 1907, Blair Bell, Neumann Besney, Strassman, and Popoff, 1930) or fibrosarcoma (Moots) or grouped under carcinomata (Murphy, 1935). The special cylindromatous type of primary carcinoma of the ovary, mentioned by Krompecher, appears to include instances of this tumour. Bell (1915) seems to have given the first description of a case of the masculinising syndrome accompanied by a tumour of the ovary with a glandular structure and lipid containing interstitial substance. Although a number of cases of this kind have been reported since, its incidence can by no means be regarded as frequent. The dysontogenic group forms only a small fraction of the total incidence of neoplasms occurring in or about the ovary (2.7%-Novak and Gray, 1936, 3%-Davis, 1936). Again, in this group, arrhenoblastoma appears to be much more

infrequent than the other varieties. In the collection of malignant neoplasms of the ovary of Novak & Gray (1933), arrhenoblastoma formed only 1.7% of the total, while the other members of the dysontogenic group (granulosa cell tumour 14%, dysgerminoma-4% and Brenner tumour-2%) formed the remaining 20%. Dockerto (1939) observed only 4 cases of this kind in 400 cases of solid tumours of the ovary, and one of them was clinically typical and nonmasculinising. Sarkar and Tribedi (1939) reported the first case from this country. The case recorded below is the second to occur in the experience of one of the writers (P R Rao) and was considered worthy of record on account of certain unusual clinical and pathological features it presented.

CASE REPORT

A hindu female, aged 22 years, mother of two children-5 and 2½ years old respectively, was admitted on 9-6-1939 under the care of one of the writers (K N Murti) for swelling of the abdomen and feet of six months' duration. The lactation after her last confinement had been observed to be excessive and the breasts full. Ten months later she had observed giddiness, loss of appetite and the periods becoming irregular and scanty and ceasing totally after another three months. A pelvic tumour was diagnosed at that time, but its operative removal was declined by the patient.

Menstruation, though scanty was however restored by the administration of a

couse of some proprietary product by her attending physician. Masculine hoarseness of the voice, and a profuse crop of acne vulgaris followed by the appearance of coarse hair on the upper lip and a beard, were observed a couple of months later. In October 1938, she was operated for bleeding piles of about five months' duration. About this time the menstruation had become irregular with pain during and burning sensation after coitus, locally. A progressive swelling of the lower abdomen was first noticed by the patient in January 1939 and became

phy of the clitoris, atrophy of the breasts with prominence of the nipples, ascites, and oedema of the lower extremities were observed. About 350 oz of clear sterile transudate (Sp Gr 1.010, Alb 1.4%, Globulin-0.4% Chlorides-45 Mgm%,) were withdrawn each time by paracentesis abdominis on three occasions between 11-6-1939 and 17-7-1939. A slightly nodular, centrally situated, somewhat mobile tumor of the size of a coconut arising from the pelvis was revealed after paracentesis. Laparotomy on 20-7-1939 by one of the writers (C. P. V. Menon) disclosed much ascitic fluid, slightly cirrhotic liver, no adrenal abnormality and a large

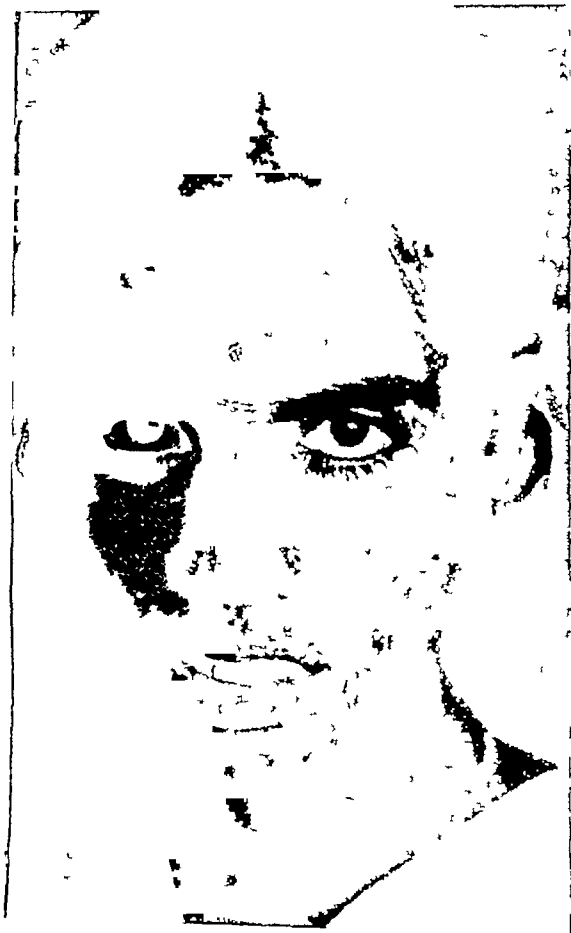


Fig 1

rapidly worse with much discomfort, since April. Swelling of the feet soon followed. On admission a well marked masculine habitus and voice, hirsutism particularly of the face (Fig 1) pronounced hypertro-



Fig 2

pedicled tumour, solid in parts and cystic in others, arising from the left broad ligament and also adherent to the right pelvic wall and coils of the bowel. The removal of the tumour was followed by a temporary noisy hysterical state which subsided in

three days Improvement of the voice and spontaneous depilation of the face (Fig 2) and limbs were noticed from 6-8-1939 By 22-8-1939 the breasts had filled up and a definite return to the feminine habitus was appreciable Menstruation and sexual libido had returned by 31-8-1939, although the clitoris has shown no evidence of regression Neither the ascites nor the tumour recurred up to the time of reporting

The tumour weighing 78 gms was ovoid in shape and measured 18.6 X 10.5 cm The capsular surface was somewhat lobulated, markedly vascular and adherent in the upper part to the adjoining viscera by fibrous adhesions The consistency was solid in the lower part and cystic in the upper The sectioned surface showed a solid, lobulated, greyish white firm lower half resembling a fibroadenoma in appearance with a few scattered areas of mucoid change in the central zone adjoining the multiloculated cystic upper part of the tumour The cysts in this part were thin walled variously sized, and contained clear transparent non-coagulating fluid Some of them contained solid haemorrhagic masses, attached to the wall, inside the lumen, a few had a thin translucent easily detached lining membrane Those at the upper pole resembled a cystic hygroma in appearance A small serous sac-like space was present immediately underneath the capsule at the hilum adjoining the ovarian attachment The slightly flattened shrunken left ovary was attached to the tumour by a short pedicle near its centre and showed a few follicular cysts on the sectioned surface

The tumour presented a very varied histology in its different parts In the solid areas, there was generally a loose mucocellular embryonal type of connective tissue background On this were seen adenoid elements in different formations, either

in solid cylinders or in branching cords or in close clusters of convoluted or twisted columns with a highly cellular stroma containing a network of capillaries in close contact with the adenoid elements or in alveolar or pseudo-tubular formations also in intimate relation with a network of capillaries and a markedly cellular stroma containing scattered minute collections of granular neutral and anisotropic fat In the two latter mentioned formations the capillary walls have abundant argentophilic reticular fibres as in sinusoidal capillaries The cells forming the adenoid element are epithelioid in type with flattened plump endothelial type of nuclei and scanty cytoplasm The upper part showed numerous anastomosing trabeculae of undifferentiated fibroblastic type of mesenchymal cells, in a mucocellular background similar to that seen in other parts of the tumour, either differentiating into wide cavernous lymphatic cystic spaces or capillary angiomatous lobules Numerous haemorrhages were seen in the loose stroma of the area The section of the left ovary showed not only a number of germ cells and atretic follicles, but also a Graafian follicle The mesovarium showed scattered branching tubular epithelial structures probably of Epitheliomatous origin

COMMENT:

Definition Tumours of the ovary with a tubular structure histologically directed towards that of a male gonad, irrespective of their influence towards male secondary sexual differentiation, were styled by Mayer (1930), Arrhenoblastomas The histological basis of this definition, evidently designed to include recorded cases of the so called testicular tubular adenomas (Popoff 1930) without somatic changes of masculinisation, offers, however, very precarious ground for

clinical diagnosis In view of the fact that the ovary and its ligamentous attachments frequently contain mesonephric epithelial tubular paroophoric or epoophoric remnants capable of initiating adenomatous neoplastic activity, it would appear that the conclusion of a male gonadic direction of a tumour, based merely from the presence of tubular or cylindroid epithelial elements in it is hazardous That in none of the cases of the testicular tubular adenoma so far reported, convincing differentiation of the tubular elements to seminiferous tubules or to spermatogonia has been observed, is to be admitted (Schiller) Besides, the ontogenesis of rete ovarii—the ovarian homologue of the medullary cords—to which this type of tumour is traced, is still a matter of controversy It has been at least in part derived from the Wolffian body (Grunwald, Neiman and others) and regarded as continuations of the epoophoric tubes into the hilum of the ovary Thus the diagnosis of an arrhenoblastoma merely on histological grounds in the absence of somatic changes of masculinisation is clinically impossible, histologically uncertain, and ontogenically controversial On the other hand, if the somatic changes of masculinisation dependent on the mesodermal interstitial cells of Leydig are accepted as the criteria for the diagnosis of an arrhenoblastoma, and the atypical epithelial elements seen in excess in this tumour are adjudged on the basis of functional evidence as derivatives of the anlage of the cells of Leydig, then not only is clinical recognition of such tumours facilitated but also the necessity for the anomalous correlation of maximum sex reversing functional activity with a sarcomatous anaplasia of the tubular epithelial elements as is attempted by Mayer, does not arise It may be pointed out here that the cells of Leydig exist normally as irregular cords not histologically distinguishable with ease as either epithelial or

mesodermal Besides, when it is remembered that the ovarian medullary anlage, before its successive differentiation into the male and female gonadic interstitial elements, in response to successive waves of proliferative invasion of the germinal epithelium, lies adjacent and practically continuous with that of the suprarenal, the occurrence of masculinising tumours in the adrenal cortex or mesovarium can be easily understood as the result of the presence in these situations of wandered or isolated rests of the male motivated ovarian medullary mesenchyme In view of the bisexual potentiality of such rests, the presence of lipoid containing leutein cells in arrhenoblastoma or of masculinising Leydig cell derivatives in Leutomas (Spielman) is less disturbing to established embryological and anatomical facts

AETIOLOGY Arrhenoblastomas are usually seen in parous (1-4 children) women of the reproductive age (21-35 years) Maxwell (1937) however recorded a case of post-menopausal (62 years) incidence Rottino and Mograth (1939) observed it in a sterile woman Incidence in unmarried women (Dockerty, 1939) and girls between 18 and 20 years (Novak and Long, 1933, Taylor et al 1933, Saphir and Parker, 1936, Dockerty, 1939, Sarker and Tribedi, 1939) has also been recorded The dysontogenic origin of these tumours is generally conceded The older view (Pick, 1905) which derives it from the testicular elements of an ovo-testis has no adherents now, as hermaphroditism is never observed accompanying it McLester advocates, that the blastomeres isolated at the time of the invasion of the mesenchyme of the Wolffian body by the germ cells through the hilus are the source of the neoplasm According to this view the resulting neoplasm is an one sidedly developed teratoma (L'Esperance) Spielman (1933) indeed includes teratoma of the ovary among the masculinising tumours The

occurrence of omental metastases with a spindle cell sarcomatous structure containing cartilage-like areas, fifteen months after the removal of the primary tumour, in the case reported by Taylor et al (1933) is regarded by them as an evidence in support of the teratomatous nature of the masculinising primary ovarian tumour. But more commonly the structure resembles that of a mixed tumour, as described in the case reported above. On account of this mixed structure, the ontogenesis of the tumour has probably to be traced back to rests of an earlier undifferentiated stage of the mesonephric mesenchymal anlage with bisexual potentiality, capable of differentiation into both Wolffian and genital derivatives according to the following plan of histogenesis suggested by Neiman (1936)

facial germinal epithelium, are more likely to remain in the depths of the medulla away from the surface, than near it. The bisexuality of the early ovarian mesenchyme is the heritage of the primary bisexual zygote (Fischel). Sex differentiation of the gonads and their affiliated endocrines in a particular direction is determined by the impulse of the X-chromosome. Since neither male germ cells nor typical seminiferous tubules have been observed in any instance of arrhenoblastoma, the presumption of a developmental error of the X-chromosome (Schiller 1939) as an aetiological factor is unsustainable. The forces initiating neoplastic activity in these mesonephric rests are as obscure as elsewhere. Popoff's (1931) contention that it is the result of an upset of the balance between the female

Embryonal anlagen of the gonads			Derivatives
Mesonephros	Caudal part	Wolffian body	Connective tissue of the ovary Rete ovarii, rudimentary epoophoron
	Medial part	Genital ridge	Seminiferous tubules Interstitial cells Graafian follicles Pflüger's cords Surface epithelium

Schiller (1936) also believes in a somewhat similar genesis of the masculinising elements of these tumours from primarily bisexual anlagenic remnants. The conclusion drawn by Witsch from biological evidence, that, in the gonad the medullary situation of the germ cells determines their masculinity and the cortical situation conditions their femininity, loses its significance in tumours situated outside the ovary. The more common medullary situation of the arrhenoblastomas in the ovary, may however be explained by the fact that rests of undifferentiated amphisexual mesenchyme which escape the masculinising or feminising influence of the successive proliferative waves of the super-

tissues (Oocytes and membrana granulosa) and masculinising elements, by a diminution of the ovarian mass by disease or excessive functioning, has very little support from either the reproductive history of the cases or the condition of the ovaries in this disease. The factors controlling the differentiation of the neoplastic tissue, into the masculinising or feminising elements are also not clear. Anyway, it cannot be said here, that the differentiation of the male interstitial elements in the tumour is a response to the invasion of the special mesenchyme by the male germ cells, as the latter has not been shown to be present in these tumours.

PATHOLOGY GROSS ANATOMY

Arrhenoblastomas occur invariably unilaterally with probably equal frequency in the two sides, though Popoff claims greater stability, regarding disorders of developmental origin to the left gonad on account of the lodgement of a larger number of germ cells in the left genital ridge (Firket, 1914, Swift, 1915). In the majority of cases the tumour was located in the ovarian medulla near the hilum. Taylor et al (1933) reported a case in which the tumour was intraligamentous with a pedicle and peritoneal adhesions to adjoining viscera as in the case under report. Popoff refers also to meso and parovarian localisation of the tumour. They are usually solid (Dokerty 1939) but in many instances they are cystic in parts and solid in others as described in the case reported here. In Taylor's case (1933) the cysts contained 4000 C C of thin brownish fluid. In the case recorded above, some of the cysts were follicular and others lymphangiomatous, with clear, thin fluid contents. Novak and Cray (1936) however describe the cysts as degenerative in nature. The size of the tumour varies from that of a chestnut (Popoff, 1930) to that of a full term gravid uterus (Taylor et al, 1933). The shape is usually ovoid with an encapsulated, some what uneven flatly lobulated surface.

HISTOLOGY The mixed histology of the tumour has been further complicated by the attempt to include in them the so called somatically non masculinising testicular tubular adenomas on questionable grounds of histogenesis. Convoluting tubular structures resembling seminiferous tubules described by Pick (1905) Popoff (1930) and others in the so-called testicular tubular adenomas, have not been seen by Novak and Gray (1936) and were not present in the case reported above. Even when present, their origin as already pointed out, from

paroophoric or epoophoric tubular elements cannot be eliminated unless their tendency to further differentiation to the various stages of spermatogenesis is more clearly discernable. If however the so-called testicular tubular adenomas are eliminated from the group of arrhenoblastomas, then the latter tumour would present a remarkably uniform histological picture, which however, has a close resemblance to that of a mixed tumour, both in its embryonal type of the stroma—poorly fibrillated but rich in argento-philic reticular fibres—and in the varied morphology of its parenchymal elements in its different parts. Cysts lined by mucus producing cells having no resemblance to the cells present elsewhere in the tumour were observed by McLester. Neumann found the interstitial cells of Leydig in great profusion in one of his cases of atypically tubular adenoma. The architectural variations of the epithelioid elements such as atypical tubules loosely lined by thin cylindrical cells without basement membrane, zigzag cylinders with plump oval nuclei arranged compactly and vertical to their long axes, solid branching cords and compact clusters of epithelioid cells in the process of being vascularised were well illustrated in the case recorded above. The angiomatous (capillary and cavernous) character of the parenchyma in certain parts of the tumour is yet another unique feature of our case, which points to mixed or teratoblastomatous histogenesis. Sirkar and Tribedi also refer to the presence of large and small blood spaces enclosed by indefinite, illformed, endothelial lining, in their case. The blastomatous nature of the parenchyma, consisting of whorls, groups, or fasciculi of small round or spindle shaped cells, observed particularly adjoining the angiomatous areas, has been designated sarcomatous by many writers (Novak and Long, 1933) and construed as sarcomatous degeneration of

the stroma by Mayer (1931) In the case reported by Taylor et al (1933), which recurred with omental metastases 15 years after the removal of the primary growth, the epithelioid elements were only seen after careful re-examination In spite of this, the tumour is generally regarded as one of low malignancy (Novak and Long 1933) and not metastasising (Popoff, 1930), though Strassman (1930) found in all cases except one out of 13, malignancy with metastasis supervening eventually in 6 or 7 years Yet another type of cell occurring either singly or in groups interpreted as interstitial cell by Mayer (1931) and Novak and Long (1933) has been described Similar cells containing lipid (anisotropic and neutral fat) were also observed interstitially by Taylor et al (1933) and by the writers Popoff (1930) strangely views them as evidences of a regressive fatty metaplasia of the cells of the medullary cords, owing to the vascularisation of the latter Schiller (1936) finds in them resemblance to Leydig cells It does not appear useful to speculate over the histogenesis of such straggling lipid containing cells of the stroma as these On the other hand the intimate relation of the rich network of capillaries of the sinusoidal type (with a profusion of argen-tophilic reticular fibrils on their walls) to the epithelioid elements lodged in their meshes is a more reliable evidence of the probable endocrine nature of the latter As the masculinising endocrine tissue is the interstitial cell it necessarily follows that the atypical epithelial elements of the tumour are related ontogenically to the male interstitial cells The extreme vascularity of such areas was also pointed out by Taylor et al (1933) and Schiller (1936) but the probability of the masculinising endocrine role of the epithelioid elements was not entertained by them, although Bencke rather unorthodoxly maintained that the hormonal activity of the

tumour varied inversely with the degree of differentiation of its tissues or as Mayer stated, on the extent of the atypicity of its rudimentary testicular tissue and its sarcomatous setting That the so called sarcomatous change is unconcerned with the endocrine effect of the tumour is supported by the fact, that there was no return of masculinity with the appearance of sarcomatous metastatic omental recurrences in the case reported by Taylor et al (1933) In the circumstances it appears reasonable to look upon the epithelioid structures as has already been pointed out as the masculinising derivatives of the anlage of the interstitial cells of Leydig

OTHER CHANGES

The comparatively normal appearance of the ovaries which contain primordial and developing follicles but no corpora lutea (Rottino & Megrath 1939), was confirmed in our case This observation is in consonance with the fact that in certain cases, local resection of the tumour is followed by normal pregnancy (Dockerty, 1939)

Ascites had also been observed by Taylor et al (1933) and Rottino & Megrath (1939) in their cases Its permanent dis appearance after removal of the tumour indicates a cause and effect relationship between the tumour and the effusion But the exact mechanism of this ascitic effusion, as in Meig's syndrome, is obscure

CLINICAL

The clinical picture is dominated principally by changes leading to (1) defeminisation and (2) masculinisation (Meyer, 1931 Novak and Gray 1936) The former constituted by scantiness and irregularity of menstruation terminating eventually in amenorrhoea, sterility, either atrophy of the breasts or a flabby pendulous state of the same with coarseness and pigmentation of the nipples,

loss of female panniculus, sometimes atrophy of the uterus and ovaries, contraction of the vagina (Taylor et al, 1933) and falling off of the hair of the head (Counseller 1933) are less striking and more inconstant Spielman (1933), besides observed a complete absence of the blood cycle of the female sex hormone, though Dockerty recorded the presence of excess of prolactin in the urine in one of his cases in which menstruation continued till a very late period in the disease, as in the case recorded by us above. The Zondek Asheim reaction is negative (Taylor et al). Sexual libido remains unchanged till late in the disease. The unusual occurrence, in the case described by us, of evidences of excessive feminisation, such as hypertrophy of the breasts and hyperlactation ten months before the onset of the signs of defeminisation, as well as the continuation of the menstrual cycle till late in the disease are probably to be explained by the functioning condition of the ovaries.

The masculinising changes constituted by a masculine habitus with increase in musculature, widening of the shoulders and flatness of the pelvis, coarseness of the skin with prominence of the veins, male hirsutism, bushy eye brows (Taylor et al 1933) enlargement of the laryngeal cords with prominent pomum and voice changes, coarseness of the features with coarse hairing of the upper lip and beard and hypospadiac penile clitoris, are more striking and constant. Skin lesions such as erythematous patches on both legs (Dockerty) or acne-form cutaneous eruptions on the face as in the case recorded by us may be present. The defeminising changes usually precede the masculinising ones by some months to about a year (Sarkar & Tribedi 1939).

Pituitary type of obesity (Dockerty, 1939) obesity of trunk, face and neck—polycythaemic lividity of complexion, hyperglycaemic glycosuria, hyperthyroidism (Rottino

& McGrath 1939) massive effusion into the peritoneal cavity (case recorded above) and sometimes pleural cavity, slight anaemia, leucocytosis, fever, vomiting and pain during micturition and defaecation (Taylor et al) may sometimes occur. Burning pain after coitus was also complained of in the case reported by us. The final appearance of bleeding piles and oedema of the feet in this case are probably the result of pressure by the tumour.

Removal of the tumour is followed by the return of menstruation, regression of hirsutism, improvement in the voice, hypertrophy of the breasts and return of the sexual libido in about a month. The feminine habitus returns in about five months (Taylor et al, 1933). Onset of normal pregnancy after local resection of the tumour has been recorded by Dockerty (1939). In the case recorded above the post operative onset of noisy hysterical state for a short while, is probably the result of a sudden dislocation of the temperamental orientation brought about by the endocrine effect of the tumour.

SUMMARY

(1) A case of arrhenoblastoma of the left broad ligament showing certain unusual clinico-pathological features such as evidences of excessive feminisation in the early stages, incomplete defeminisation in the later stages, ascites, post operative temporary hysterical state, and almost complete and early post-operative regression of all these changes except the hypertrophy of clitoris is reported.

(2) A teratoblastomatous origin of the tumour from sexually bivalent remnants of the mesonephric ovarian anlage is favoured on histological grounds.

(3) The restriction of the definition of arrhenoblastoma to include only somatically masculinising, histologically characteristic tumours of the ovary or its adnexa is advocated

(4) The structural analogy to mixed mesenchymal tumours is pointed out

(5) The atypical epithelioid elements of the tumour are viewed as the endocrine elements of the tumour on histological grounds and as derivatives of the anlagen of Leydig's interstitial cells on functional evidence

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AFFECTIONS OF BONES AND JOINTS IN SMALL POX

by Mr N S Narasimhan, F R C S (Eng) Orthopaedic Surgeon, General Hospital, Madras,

Chiari in 1891 performed 22 autopsies on variola cases in the various stages of the disease and on 2 children who died 2½ months after variola. In all bones examined nonsuppurative, sterile, necrotic foci were found in the bone marrow. These foci had definite variolar characteristics but these foci did not show any evidence of suppuration. There were evidences of isolated, nodular, pale foci in the bone marrow. The obliterated structure of the bone marrow was being replaced by granular detritus suggesting that resorption was in progress. In this case there was no evidence of suppuration. It was his belief that these foci in the bone marrow caused the bone lesions which often accompany cases of smallpox.

Mallory in 1894 examined microscopically all cases of bones from 14 patients dying of variola, and concluded that in variola the marrow from various bones shows more or less numerous circumscribed inflammatory foci associated with central necrosis due to variola infection, with the foci more numerous in the short bones.

In 1903, Debeyre observed that cases of osteomyelitis complicating smallpox rarely ended in suppuration.

Musgrave and Sison (1910) described deformities of forearms and hands caused by attacks of smallpox during childhood. All the eight patients on whom observations were made were adult and elderly Philipinos. Roentgenographic study was not available then in Manila but from their classical studies these observers reported shortening of forearms, irregular enlargement of elbow joints and deformities of the

bones of the wrist, hand and fingers. There were no subjective symptoms of any kind, which could be associated with these lesions. There were no scars or contractions nor were there other evidences of an objective character present. There was nothing in the history to indicate that the condition was the result of an acute inflammation such as is sometimes seen about the joints in smallpox. In the discussion which followed this report, it was stated that in the literature on smallpox no mention was made of lesions similar to those described.

Musgrave and Sison concluded in 1910 that the nature of the process was a destructive lesion in the epiphyses of bones, shafts were normal, the ends of the bones became enlarged and irregular in shape and similar changes were encountered in the carpal, metacarpal and phalangeal bones. A striking feature of the deformity was its constant location in the upper extremities, these usually being confined to one or both forearms. The articular cartilages of the bones were involved. This complication of smallpox was always noted in infancy and childhood.

In 1912 Cange reported three cases of deformities of the forearms and hands following smallpox.

Keyselty and Mayor (1911) described lesions in the internal organs and bone marrow in a case of confluent smallpox.

In 1913, Musgrave and Sison made a second report on a study of 12 cases, 4 males and 8 females with plates, skiagrams, and an autopsy report by Dr B C Crowell. They confirmed the conclusions arrived

at in their first report and added the fact that the long bones of the lower extremity also may be affected. They concluded that deformity may follow variola contracted at any time before the complete ossification of the bones and that the circumferential growth of these bones was quite undisturbed as there was no sign of underdevelopment in diameter, thus proving that the periosteum on which circumferential growth depends was not affected. They reported in one case ankylosis of the temporo-mandibular joints with deformity of the ramus of the mandible consisting of diminution in length and certain irregularities along its anterior surface. The autopsy report on the body of a female aged 32, who died of tuberculosis of lungs and colitis, with deformities due to smallpox which she had as a little girl, described changes seen in the elbow, wrist, knee and legs.

Osler and Macrae (1919) mention in their book that "Arthritis may occur usually in the period of desquamation and may pass on to suppuration. Acute necrosis of the bone is sometimes met with. In the haemorrhagic form, haemorrhages in the bone marrow have been described."

F B Sheldon (1922) reported among the Chinese one case showing marked deformities of the elbow and forearm and another case which showed involvement of the tibia, fibula and ankle joint.

Brown and Brown (1923) described a special necrotic non-suppurative form, most commonly met with in childhood, which frequently destroys the epiphyses.

J W. Cathcart (1924) reported two cases of bone dystrophies of variola with six lesions in one case (one in tibia) and two lesions in another case. Cathcart "asserts that the smallpox bone lesion is specific, necrotic foci are scattered

throughout the osseous system and where the disease is sufficiently extensive ossific centres in developing bone may be destroyed and the growth of the bone inhibited, producing marked deformities.

Hajekens and Rigler (1926) described a case in its acute stage. A boy aged 6 years, developed, some days after the diagnosis of smallpox had been made, tender and fusiform swelling of many of the joints in the body, especially those of the extremities. The roentgenogram showed a roughening of the diaphyseal side of the epiphyses as well as a roughening of the epiphyseal side of the diaphyses. The swellings never developed evidences of suppuration, and in due course they and the tenderness subsided.

Lombard (1929) reported two cases of deformities following smallpox. One case involving the elbow and another involving the lower and upper ends of the radius and the bones of the left knee and ankle.

Eikenbary and Lecocq (1931) reported 3 cases of deformities after smallpox. One was a case of deformity of right wrist in a girl aged 11, the second and the third were cases of shortening of the femur in boys aged 7 and 14 respectively, due to disease of the lower epiphysis of the femur. These cases are noticed in the Medical Annual of 1932 by J D Rolleston. Eikenbary and Lacocq concluded that the virus of smallpox apparently affects only the epiphyseal lines of the bones. The effect of the smallpox virus on the epiphyseal lines of the long bones is to produce an aseptic necrosis which chiefly affects the growing cartilage cells of the epiphyseal lines and causes premature closure. In none of their cases was there any complaint of pain, the patients with smallpox who develop bone complications do not show deformities until after the attack of smallpox.

Brailsford (1935) writes "Hajekens & Rigler have illustrated destructive lesions

about the epiphyseal lines which developed in a boy of 4 years of age, simultaneously with the eruption of variola "

Kohler (1935) wrote " typical, non-purulent, sterile necrotic lesions in the whole osseous system, affecting the ossification centres also and thereby hindering their growth, were observed in two cases after smallpox "

CLASSIFICATION AND GROUPING OF CASES

Although smallpox is common in India there is no literature dealing with the incidence of bone and joint lesions in this disease. The numerous foci of suppuration in the later stages of smallpox may give rise to boils and abscesses. The boils may arise from infection from the pustules or through the hair follicles, the pustules usually contain streptococci and staphylococci (aureus and citreus), other bacterial forms are also met with. I have provisionally classified the bone lesions which occur in smallpox as follows

- (a) Those due to secondary infection from the pustules,
 - (1) arthritis
 - (2) destruction of epiphyses and subsequent defects in growth with deformities
 - (3) osteomyelitis
- (b) Those due to the virus of smallpox
 - (1) necrotic foci with destruction of epiphyses and subsequent deformities
 - (2) necrotic foci in the shafts

In the first group of cases prophylaxis is more important than curative treatment. Careful and efficient nursing of smallpox cases is very essential if the incidence of abscess, arthritis and bone disease is to be decreased. The eruptions ought to be properly treated with -

Starch	30 parts
Salicylic acid.	3 "
Glycerine	67 "

This should be applied to the eruptions every 3 or 4 hours to check local infection and thus prevent or minimise the subsequent formation of boils

"CASE REPORTS"

A description of sixteen cases seen in the orthopaedic department of the General Hospital, Madras, follows -

(1) P female child aged 4 was seen suffering from fibrous ankylosis of the left elbow after smallpox contracted three months previously. Radiograms showed osteoperiostitis of all the bones of the elbow joint but no destruction of epiphyses.



Fig I Case No 1 - 3 months after smallpox - osteoperiostitis of all the bones of the elbow. Epiphyses intact

(2) M female, aged 12 years. History of smallpox in childhood. The left wrist showed shortening of the radial shaft with

destruction of the epiphyseal part of lower end of the radius and broadening of the diaphyseal end

The left elbow showed destruction and irregularity of the radial head with ankylosis of the humero-ulnar articulation and lipping of lower end of humerus

The right elbow was similarly affected with lipping of the humerus and partial destruction of radial head Fig II



Fig II Case No 2 —Right elbow showing destruction & irregularity of radial head and ankylosis of the humero-ulnar articulation

The right wrist presented the appearance of an epiphysitis of the radius which was markedly shortened. The epiphysis was present but there was premature closure of ossification Fig III

(3) T male, aged 10 years History of smallpox in childhood, seen on 23/5/1938 Humerus was short, and there was synostosis of the humero-ulnar joint

(4) K, female, aged eleven months Seen on 3-4-1939 History of smallpox during the previous month The child had

arthritis of the right knee which was kept flexed A sinus was present over the front of the right knee The radiogram showed slight irregularity of the epiphysis of the lower end of the femur

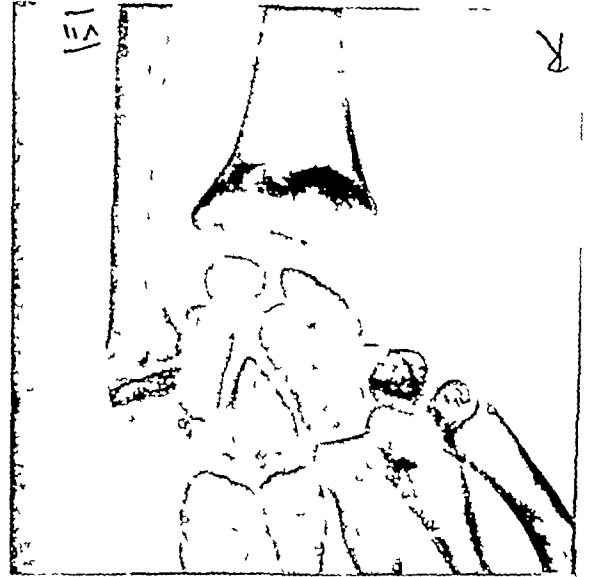


Fig III Case No 2 —Right wrist, epiphysitis of radius and a short radius

(5) B B J, female, aged 8 Seen on 28-5-1939 History of smallpox six months before Right elbow allowed some range of movement There was irregular destruction of the epiphysis of the lower end of the humerus, numerous scattered foci of osteoperiostitis in the shafts of all the three bones with sequestra The shaft of the left fibula was affected both centrally and periosteally Fig IV

(6) R, female, aged 16 Admitted for pain over the right elbow joint Suggestive of post variolar deformity of the humerus, but there was no proof of this, there was no history of injury, the upper end of the right humerus appeared abnormal, there was shortening of the humerus

The distance from acromion to external condyle was ten inches on the right side and eleven and a half inches on the left

side and there was wasting of all the muscles around the elbow joint. The radiohumeral joint resembled osteoarthritis deformans. There was broadening of the upper end of

arthritic changes in the sigmoid notch of ulna.

(8) A, Male aged 6 years, was seen on 19th September 1939 with a history of smallpox six months previously.

Examination showed radial abduction of the left wrist. Movements of the left elbow were present but limited. There was marked cubitus varus. Internal condyle of the humerus was very prominent. There were a few scars on the back of the left elbow. The left forearm itself appeared shortened, first metacarpal was short, the epiphysis of the fifth metacarpal was absent, Fig V.

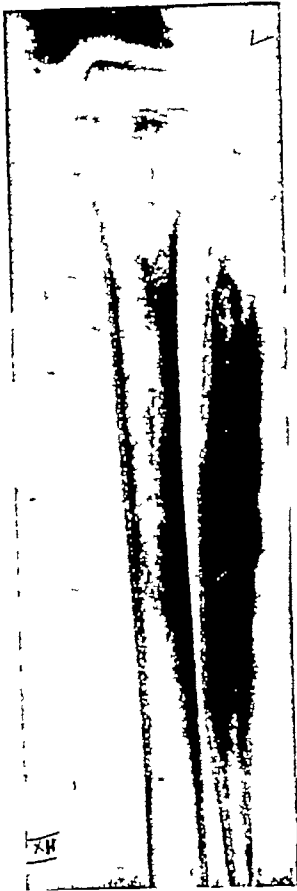


Fig IV Case No 5—The shaft of the fibula affected both centrally and periosteally

the radius, on the medial side of the upper end of the ulna there was a fragment of bone. A radiogram showed certain amount of new bone formation above the olecranon. Movements—The elbow could be flexed only to 40° and extended up to 140° . Pronation free. Supination to mid-way between pronation and supination.

(7) R, Male, aged $1\frac{1}{2}$ years. History of an attack of smallpox one and half months back. Was seen on 1st April 1939 with swelling and pain in left elbow of one week's duration. Radiogram showed

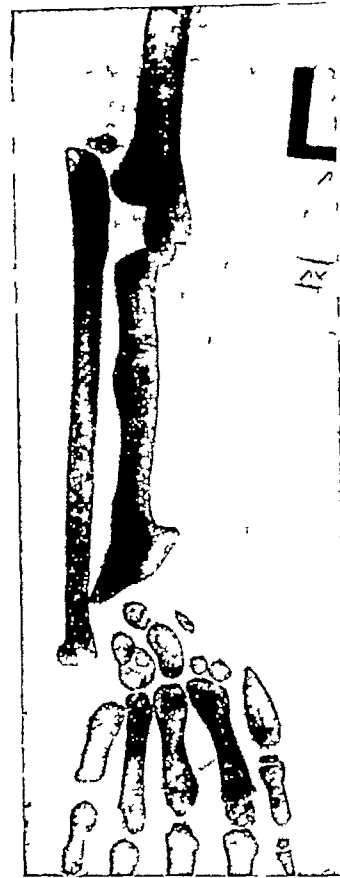


Fig V Case No 8—Absence of upper and lower epiphysis of radius, necrotic foci in the centre of the shaft and near the lower diaphyseal end, broadening of the

lower diaphyseal area, Partial destruction of medial half of the epiphysis of lower end of humerus

Right forearm and elbow—Scars noted over external condyle of humerus, upper end of ulna and over the wrist, movements of the elbow present but limited, cubitus varus marked, the wrist abducted radially, osteomyelitis of shaft of the right humerus

The following radiological appearances were seen (1) osteomyelitis of centre of shaft of the humerus with a sequestrum (2) absence of upper and lower epiphyses of radius on both sides (3) osteoperiostitis of the centre of the shaft of the right radius (4) partial destruction of medial half of the epiphysis of lower ends of both humeri Epiphysis of the inner condyle showing degenerative changes

(9) S G, male, aged 19 years Gave a history of injury to the right elbow and an attack of smallpox as a child of 3 years The trochlear surface of the humerus was irregular The head of the radius was deformed chiefly on the inner aspect Movements of the elbow were quite good

(10) R, female, aged 5 years, was seen for restricted movement of the left elbow two months after an attack of smallpox, there was no history of injury Radiograms showed the epiphysis of the lower end of the humerus to be smaller, partial destruction of the sigmoid cavity of the ulna and the head of the radius imperfectly formed and the presence of several necrotic foci in the upper ends of both radius and ulna, the upper end of the ulna at the site of the future epiphysis appeared to have been affected

(11) S B, male aged 4 years History of smallpox three months ago Was brought to the hospital for restricted movements of both elbows with sinuses, the elbows were held at an obtuse angle

(12) G male, aged 8 years Had smallpox at the age of 2 He could not bend his right elbow and cubitus valgus was present, pronation and supination were defective, there was thickening of the head of the radius

(13) V, male, aged 20 years was seen on 5th July 1939 with a history of smallpox five years ago There was ankylosis of the temporo-mandibular joint on the left side, the left half of the lower jaw was smaller in size and slightly irregular in formation Both the maxillae were ill-developed

(14) N, male, aged 5 years History of smallpox at the age of 2 Was seen for swelling over long bones and for a sinus over the right leg The child was rickety with pigeon chest On examination, left elbow—flexion was complete but extension was limited to 120° , forearm was kept pronated, supination was present, there were two incisional scars on the back of the elbow The length from the acromion process to lateral epicondyle was $6\frac{1}{2}$ inches on the left side and was 8 inches on the right

Right Elbow—Flexion was complete extension was present up to the limit of 120° , lateral condyle was prominent, head of the radius was not palpable and there was a scar over its head

There were a large number of incision scars all over the body due to multiple subcutaneous abscesses

There was a sinus over the middle of the left forearm on the subcutaneous border of the ulna, lower end of the radius was thickened and there was ulnar adduction of left wrist

Radiogram showed the following changes—

(1) Right elbow and forearm—Absence of epiphysis of the head of the radius,

a stellate shadow suggesting a piece of epiphysis undergoing degenerative process in front of and behind lower end of the humerus, several necrotic areas in the shafts of radius and ulna and in the lower metaphyseal end of the diaphysis of radius, absence of lower ulnar epiphysis

(2) Left elbow and forearm —Slight posterior displacement of the upper end of ulna, marked irregularity of the lower end of the humerus and upper end of the radius, absence of upper epiphysis of radius and lower epiphysis of ulna

(3) Right knee — Upper fibular epiphysis absent with destruction of diaphysis for nearly $\frac{3}{4}$ inch, necrotic foci in the upper metaphyseal region of tibia, periostitis with sequestrum at the junction of the upper and middle thirds of the fibula. The epiphyseal line of the upper end of tibia showed

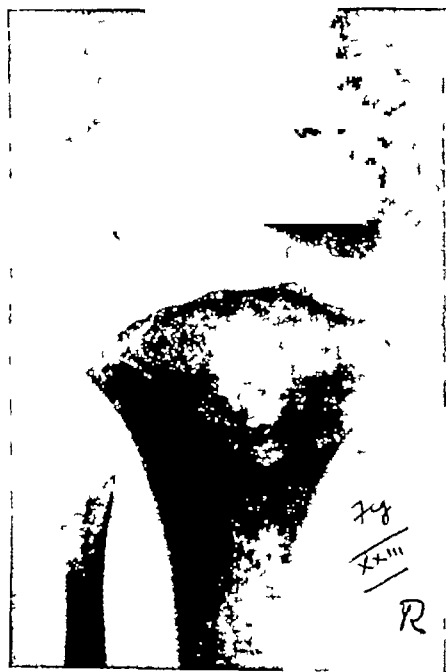


Fig VI Case No 14 Upper fibular epiphysis is absent with destruction of diaphysis for nearly $\frac{3}{4}$ inch, necrotic foci in the upper metaphyseal region of tibia.

osteoporosis in general and irregularity of epiphyseal line with absorption of area of tubercle of tibia Fig VI

(15) L, male, aged 25 years, was seen for fracture of metatarsals of the right foot on 6 February 1940. History of smallpox at the age of 2, the left ankle presented a deformity, medial malleolus was prominent, there was widening of the left ankle with considerable limitation of planter flexion. There was $1\frac{1}{2}$ inch shortening of the leg and an inch shortening of the thigh on the left side, the calf-muscles were thinner by one inch, half of the lower end of the tibia was absent and there was an adaptation of the talus to the new articular surface. Radiogram of the hips and thigh showed coxa valga on left side, the cortex of the bone was thinner and the width of the bone was less by $\frac{1}{3}$ of an inch. There was genu varum with 4 inches separation at knee.

(16) K, female, aged 12 years, was seen on 6th February 1940 for limping, there was history of smallpox 3 years ago.

Right elbow was held in valgus position, flexion was complete, limit of extension was 160° , lateral condyle of the humerus was prominent, there was a non-adherent scar on the back of the right elbow. The length from the external condyle to acromion was 8 inches on the right side and 9 inches on the left.

Left hip —There were operation scars over the lateral side of the hip and the gluteal region and the patient had just recovered from an abscess of the hip. There was shortening of the thigh segment by one and a half inches. Head was absent from the acetabulum and the trochanter was raised, telescopic movement could be elicited.

Radiogram showed —

Right Elbow — Antero-posterior view, trochlea defective, epiphysis of the head of the radius thin, sclerosed, upper metaphyseal end of the radius showed an elongated lipping on the radial side

Lateral view Epiphysis of the radius one eighth its usual size and displaced, changes in the greater sigmoid notch of the upper end of the ulna present, osteoporosis of the bones evident degenerative changes of the epiphysis of the inner condyle of the humerus and of the olecranon process

Left hip —

Head and neck in various stages of absorption, acetabulum shallow epiphysis of greater trochanter present, osteomyelitic area in the centre of the bone half an inch, below the metaphyseal end

A radiogram of an acute epiphysitis of the hip joint at this age would give a similar picture, there is nothing different except the presence of the central necrotic area in the bone Fig VII

DISCUSSION

The sixteen cases can be grouped as under

(A) SIX CASES DUE TO SECONDARY INFECTION FROM THE PUSTULES

Of the six cases there were (1) one case of suppurative epiphysitis of head of femur with pathological dislocation, (2) one case of osteomyelitis in the shafts of long bones as fibula and ulna with multiple abscesses all over the body, one case of osteomyelitis of humerus and another of fibula alone, (There was no periosteal reaction except in one case), (3) and two cases of suppurative arthritis

(B) TEN CASES WERE DUE TO VIRUS OF SMALLPOX

Amongst these, there were (1) complete disappearance of epiphysis in 8 cases (2)

partial disappearance of epiphysis in tibia in one case and (3) one case of periosteal lesion in fibula

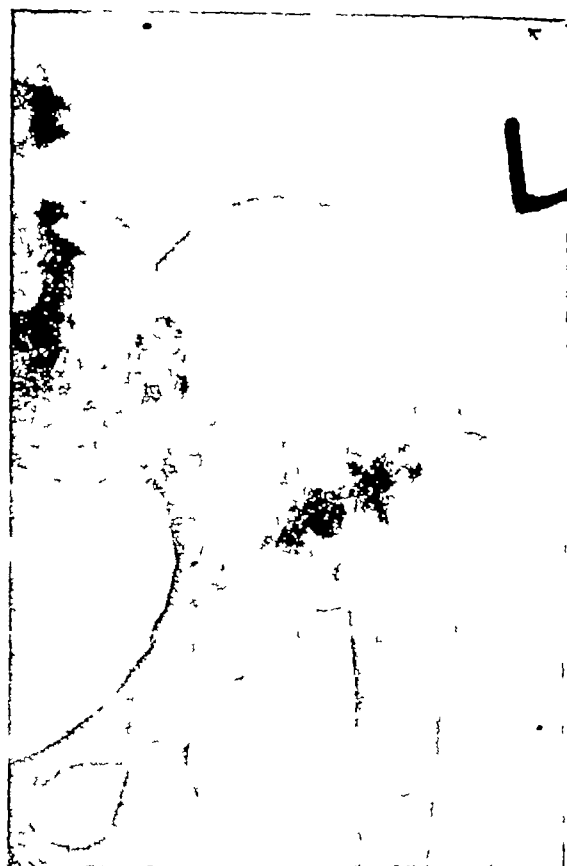


Fig VII Case No 16 —Left hip, head and neck absent

Epiphysis of trochanter present, necrotic area in the centre of the bone, half an inch below the metaphyseal end

Seven of the ten cases showed central necrotic foci in the long bones. There was shortening of humerus in 3 cases and of femur and tibia in one case

It has been remarked by most authors that bone lesions in small pox rarely ended in suppuration but here in this group these were 6 suppurative cases out of 16, cases without suppuration may not be presenting themselves for advice

Radiologically it would appear that the articular cartilages become affected, but

there is no functional impairment and the patients do not complain of any pain. There was limitation of movement in elbow joints in 4 cases. Streptococcal infection of joints may recover with functional integrity.

One of the radiological changes noted was lipping of the lower end of the humerus or of the upper end of the radius. But this change was seen at the early age of 12 and 16 and the explanation of a degenerative change such as is usually met with in senile osteoarthritis will not be correct. The usual termination of an infective rheumatoid arthritis is a painful joint with contractures.

Musgrave and Sison remarked that the circumferential growth of the bones was not affected. There was difference in the circumference of the tibia and femur in case No 15 in addition to shortening of femur and tibia and coxa valga on the left side. Circumferential growth of the bone is also affected sometimes.

Hajekens and Rigler remarked that a few days after the onset of smallpox the simultaneously with smallpox X Ray showed roughening of the epiphyseal side of the diaphysis and diaphyseal side of the epiphysis with no evidence of suppuration in a child aged 6.

The autopsy reports of Chian revealed the presence of sterile necrotic foci in the various stages of the disease.

The specific skin lesions of smallpox are seen in all internal organs and bone marrow. The pustules in the bone may be located anywhere and these are identified in radiograms.

Mallory described the bone lesions as typical inflammatory foci. The pathological process is probably one of multiple focal necrosis which is a common occurrence in typhoid, diphtheria and most bacterial

infections as a result of direct action of bacteria or toxins. Types of necrosis of bone without suppuration are seen in Raget's quiet necrosis and in the sclerotic types of osteomyelitis.

There was no opportunity to examine these foci histologically in the present series of cases.

McCallum (1938) describes necrosis as involving the blood forming cells and marginal infiltration of mononuclear elements. The formation of polynuclear leucocytes is seen to be in abeyance in the bone marrow and many degenerated forms are formed. In the later stages of the disease the mononuclear types hold a prominent place among the emigrating cells.

From these considerations I conclude that the lesions are of the nature of aseptic focal necrosis.

Clinically and radiologically the bone lesions do not resemble those of pyogenic osteomyelitis.

In pyogenic osteomyelitis, the epiphyseal line escapes destruction and there is always a good periosteal reaction. The epiphyseal cartilage is a formidable barrier to the extension of any infectious process from diaphysis to epiphysis.

There is usually no arrest of longitudinal growth of long bones in pyogenic osteomyelitis but this may be present in 10% of cases, there may occasionally be an increased growth in the length of the bones instead. But in all circumstances, the epiphysis is preserved in pyogenic osteomyelitis except in cases of acute epiphysitis of hip joint in children.

The lesions of epiphyses in smallpox require some more consideration. Case No 4 showed within a month irregularity of the lower end of the femur. Softening of the epiphyses and aseptic pressure necrosis may be suggested as a

possible explanation for the disappearance of epiphyses. Can this occur so soon as two months, the earliest time noted in the series? Does this occur in any other condition? I have observed disappearance of the epiphysis of the lower end of the humerus and of the epiphyses of the upper ends of radius and ulna and the formation of excavation with lateral processes, the inner of which shows a fracture. The condition resulted after repeated manipulations of a supracondylar fracture.

There are three conditions where interference in the development of the cartilaginous centres of epiphyses is met with. In achondroplasia, the interference takes place during the progress of intra-uterine life; the development and ossification of epiphyses are interfered with. In cretinism, there is a transverse line of dense bone in the region of the metaphyses, while the consolidation of epiphyses is delayed until adolescence. In dyschondroplasia, it is stated that as a result of the interference with the blood supply of the metaphysis the nutrition of the epiphysis is imperfect, hence the epiphysis is small and irregular in outline and it may show a premature ossification.

Finally, it should be admitted that there is no other known affection except dyschondroplasia where this loss of epiphysis and the occlusion of the epiphyseal line occur.

The bone and joint affections of typhoid resemble in some respects those of smallpox. Both in the polyarticular and monoarticular types of typhoid arthritis proper the pain is slight, the origin is spontaneous, suppuration is exceptional and the joint gradually resumes its functional activity.

Regarding the pathology of the osseous lesions in typhoid, it may be stated that malnutrition is a predisposing and injury an exciting cause of necrosis. Thrombosis and embolism are rare

causes. *Bacillus typhosus* is the direct etiological factor of all the osseous lesions and it has virulent pyogenic powers. Bone abscess, necrosis, periostitis and osteomyelitis may occur at very long periods after the original disease, the latency periods being upto 2 weeks in 10%, upto 6 weeks in 25% and many months or years in 65% of cases. Lesions are frequently multiple.

Multiple bone lesions in typhoid are not synchronous, but occur successively, often with wide intervals between the individual involvements. Periostitis is the most frequent lesion. The bone is extremely dense in typhoid, periostitis and osteomyelitis do not affect the general health. The lesions are small in extent, involve only the marrow, cause slight destruction and are almost purely local in their effects. This may be due to an acquired immunity resulting from the disease.

In typhoid fever and smallpox, areas of necrosis in the bone offer a nidus for secondary infection by pyogenic cocci (Albee).

There is no other bone disease similar to that which occurs after typhoid, in which the infection is latent, for many years before signs of inflammation manifest themselves. The bones usually involved are the upper end of tibia, the ribs and the sternum.

In the sclerosing non-suppurative osteomyelitis of Garre, there is no formation of pus but the affected bone is very dense with obliteration of the medullary cavity.

Other conditions which affect the epiphyseal cartilage are hypovitaminoses. In hypovitaminosis 'A', there is atrophy of the epiphyseal cartilage resulting in cessation of growth. In hypovitaminosis 'C' haemorrhages occur in the bone marrow and under the periosteum, the metaphysis is

rarefied, and fractures through the epiphyseo-diaphyseal junction with dislocation of the epiphysis may occur. There is some generalised rarefaction of the osseous system, depending on the duration of the disease. The epiphyses in active scurvy are rarefied and surrounded by a linear outline, giving a ring like appearance. In active rickets (Hypo-vitaminosis D), there is generalised osteoporosis, bending of bones, cupping of the epiphyseal end of the diaphyses and disordered growth. Hypovitaminosis is extremely common in India and may coexist in cases of smallpox. Any infection will add to the severity of hypo vitaminosis. The bone lesions met with in smallpox do not in any way resemble those met with in hypovitaminosis but one must remember that the diet ordered during an attack of smallpox amongst all classes of people in this country is very liberal and consists of food with liberal vitamin supply.

The administration of liver extracts has been thought to be useful in preventing other complications of smallpox.

A comparison with another commonly known condition such as osteochondritis of different bones may be made. In osteochondritis there is a definite age group, there may or may not be history of mild trauma, the epiphysis may appear to be broken up at certain stages followed by certain recovery. The theory of causation is a vascular disturbance possibly associated with trauma of the epiphyseal cartilage. The epiphyseal lesion of smallpox does not in any way resemble that of osteochondritis.

Lesions similar to those of smallpox are seen in cases of yaws in the shafts of long bones and in the synovial membrane of joints.

I believe that the bone lesions of smallpox are due to the specific virus of smallpox, that all bones of the body may be affected simultaneously with smallpox, that the epiphyseal lesions do not depend on the severity of the disease, that they are all due to focal necrosis followed by ischaemic aseptic fibrosis and that the factors contributing to the disappearance of the epiphyses are not known.

Hypo-vitaminosis may make the condition worse but is not the cause of the associated changes.

SUMMARY

(1) Sixteen cases of affections of bones and joints in smallpox are described, 7 of whom are females and 9 males. All the patients except one were below the age of 16. The higher incidence in females has been described in their reports by Musgrave and Sison and their patients were elderly men and women who came for medical aid for other illnesses. The series presented with the exception of one are cases which have recently suffered from smallpox.

(2) Epiphyseal, periosteal, medullary and arthritic lesions are described. Circumferential and longitudinal growth of bone is arrested.

(3) The lesions are specific and are due to focal necrosis.

(4) There is a predilection for the bones and joints of the upper extremity, especially the elbow, although in some cases the lower extremity is also affected. It may be noted that the lower extremity lesions have been recorded by Musgrave and Sison in their second report.

(5) Adequate nursing and care of the skin and correct diet with vitamins A, B & D are valuable prophylactic measures.

(6) When an arthritis develops during or soon after an attack of smallpox, aspiration of the joint must be done early and if pus is found early incision of the joint will save many epiphyses from destruction

I am indebted to Lt Col M M Cruickshank, I M S Superintendent, General Hospital, Madras, for permission to publish these notes and to the staff of the Barnard Institute of Radiology, Madras, for the radiograms.

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PROBLEM OF THE FRACTURES OF THE HEAD AND NECK OF THE RADIUS

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Elbow injuries are of various types and each type has got its own peculiar points and very often affords a problem from the point of view of treatment and its results. Fractures of the head of the radius afforded one such problem and formed 12% of the total injuries of the elbow joint seen and treated from the year 1930 to 1939. A review of literature from the earliest times shows a variety of classification of this fracture and of treatment of this condition. Jones (2) gave a good classification of these fractures and also indicated the line of treatment that is to be adopted in such conditions. Notable contributions have been made by Buxton (1), Fairbank (3), King (4), Speed (7), Schwartz and Young (8), with regard to classification and treatment. King (4) has also reviewed the result of excision of the head of the radius.

The mechanism of the fracture of the upper end of the radius is very little understood and various types of fractures of the head and neck have been encountered both in the young and old, the youngest being 8 years and the oldest 55 years. In the young the fracture has been of a green stick variety at the metaphysal end of the diaphysis at the upper end of the radius and among adults the ages at which these fractures were seen was from 17 to 55, the commonest age period being between 20 and 35. On the cadaver, an inspection of the elbow joint reveals that the head of the radius when pronated is more in contact with the capitellar surface and on supination moves away from it. It has not been possible to produce fractures on the cadaver with the type of mechanism described by patients.

From the typical history obtained of falls from people who could describe the fall, it is presumed that the usual method of causation of this fracture is a fall on the out-stretched hand with the forearm in marked pronation, the whole weight of body being borne by the elbow and shoulder joints and by the muscles attached to them. This inference is drawn from 3 cases, 2 of whom were doctors who could actually describe the nature of the fall. When a man falls on the out-stretched arm the force is conveyed through the carpus and the lower end of the radius to the head of the radius. This is in direct contact with the capitellum in pronation and the brunt of the impact is borne by the head of the radius if the lower end of the radius escapes the effect of the impact without breaking. The following types of fractures were found -

- (1) Marginal fissured fracture of the head of the radius without much displacement (Adults. Figs 1 & 2) 7
- (2) The same with displacement (Adults Fig 3) 2
- (3) Hemi fracture of the head of the radius with displacement (Adults Fig 4) 2
- (4) Fracture of the neck of the radius without displacement (Adults Fig. 5.) 8
- (5) Fracture of the neck of the radius with displacement (Adults Fig 6) 4
- (6) Green-stick fracture of the neck of the radius at metaphysal end (Children Fig 7) 4
- (7) Comminuted fracture of the head of the radius (Adults Fig 8) 2

(8) Green-stick fracture at neck of radius at metaphysial end with fracture tip of olecranon (Child. Fig 9)	1
(9) Green-stick fracture of the upper third of ulna and green-stick fracture of the neck of the radius at metaphysial end (Child. Fig 10)	1
(10) Fracture of upper third of ulna and neck of radius (Adults Fig 11)	2
(11) Dislocation of elbow with marginal fissured fracture of the head of the radius (Adults Fig 12)	4
(12) Dislocation of elbow with fracture of the neck of radius with displacement (Adults Fig 13,)	2
Total	39

This classification shows the variety of fractures that involve the upper end of radius and affords many problems

SEX INCIDENCE

An analysis of the 39 cases according to sex shows that 26 males, 7 females, 4 male children and 2 female children had sustained this type of injury

The causes of injury were as follows in the series under review -

Slipping and falling	4
Injuries sustained as a result of over turning of a bullock cart	3
Fall from a height	5
Fall from a parallel bar	2
Just ordinary falls where no description could be obtained	8
Fall from cycle	6
Fall from a ladder or stair case	2
Fall from a cot	2
Motor car or bus accident	3
Motor cycle accident	2
Fall from a railway engine	1

SIGNS AND SYMPTOMS

The signs and symptoms of this fracture are the same as the general signs and symptoms of any fracture with the exception

that in these cases there is a remarkable swelling on the back and front of the elbow at the radio humeral articulation. The point of maximum tenderness is $1\frac{1}{2}$ to 1" below the lateral epicondyle and when an attempt is made to elicit movements of pronation and supination, there is marked pain and some times crepitus can be felt. In the case of simple marginal fissured fractures the symptoms may be so slight that often these fractures are overlooked and diagnosed as simple contusions or sprains with the result that some of them seek advice later for pain due to osteo-arthritic changes. Other cases of this type after diagnosis of a fracture proceed to the bone setter, and such fractures are the bone setter's dream where he cures the fracture, though temporarily, by his methods, resulting in relief of pain and subsidence of swelling. Later they come for osteo-arthritis as mentioned before. Of the type of fractures described and illustrated by Figs, 3, 4, 6, 8, 11, 12 and 13 the problem that confronts the surgeon is great because of the difficulty to promote union with good alignment and good function.

COMPLICATIONS OF THIS FRACTURE

There are no immediate complications of this fracture and the fact that it involves the joint makes it a complicated fracture. The complications for which the patients usually seek advice are limitation of movement at the elbow with pain and increased deformity of cubitus valgus, in some cases limitation of movement is very great (See Fig 14). In marginal fissured fractures patients frequently seek advice late for pain before and after exertion and sometimes for a clicking sound which is distinctly audible and annoying. This is due to osteoarthritic changes that take place at the radio humeral joint. In six cases, fractures of radial head occurred associated with dislocations of elbow. Primary or later involvement of the nerves have not been encountered. In old cases with marked exaggeration of cubitus valgus

deformity, the possibility of late involvement of the ulnar nerve is to be expected, but no such complication has so far been observed, it is necessary however to warn the patients of such a contingency

TREATMENT OF THIS CONDITION AND ITS COMPLICATIONS

Various results of the treatment have been published by various authors and in the series under review attempts were made by follow-up to evaluate the results of the treatment that was adopted in the various types of fractures. It has been found difficult to get replies from all the cases to assess the value of the treatment in its true perspective. Such of those cases that have replied by letter and those that have reported personally show the value of the treatment that was adopted. The treatment of the cases with simple fissured marginal fractures without displacement is rest for the elbow at a right angle with the forearm in supination in a plaster of Paris splint which includes the elbow and wrist joints (see Fig 15). This splint is kept



Fig. 15

for 3 weeks and then removed. Graduated

active movements are permitted with rest in a sling for a further period of 2 weeks. Later when the pain in the joint has absolutely disappeared the patient is encouraged to do free movements and work. This method has given very good functional results. Two of such cases however which have been followed up have shown slight osteoarthritic changes at the radio-humeral joint. They complained of occasional pain after exertion, such as playing a set of tennis, giving rise to symptoms of "tennis elbow". Of the types of fractures shown in the classification 2, 3, 5, 7, 12, operative treatment was the method of choice more particularly in the comminuted type of fracture of the head. In cases of this type, excision of the head is undertaken after two weeks' rest in plaster of Paris splint. In 8 cases associated with types of injuries mentioned above, excision of the head of the radius was done and in the follow-up of these cases it has been found that the results have been satisfactory. Two of these cases have to do very strenuous work, one of them has to pull the levers of signals on the railway and the other is a railway engine driver with all the strenuous work attached to his job. King (4) in a review of results of the excision of head of radius has found "Proximal displacement of the radial shaft with widening of the distal radio-ulnar joint with production of pain, weakness and tenderness at the joint resulting in prominence in the lower end of the ulna at the wrist, with limitation of ulnar deviation at the wrist and in radial deviation of the hand." These after-results never occurred in the series under review because the excision of the head of the radius was done only in adult cases. It has not been found necessary to excise the head of radius in children as in most of the cases the type of fracture was a green-stick variety of the neck at the metaphysial end of the bone. In children, in cases of marked displacement of the head in fractures of the neck

open replacement is indicated, but such a contingency never arose in the cases under review. In the type of cases that occurred in children the treatment adopted was the same as in marginal fissured fractures.

Active movements alternating with rest for a period of another week was enjoined to be followed by freedom to do all movements at the end of 4 weeks. In cases of fracture of the neck of the radius with displacement in adults, if manipulation fails to restore the fractured end into alignment, open reduction and pegging is the method of choice. In the author's series no such opportunity was afforded, because the majority of the cases came long after the accidents for the late complication of fracture viz, malunion, excess formation of callus and limitation of movement. (See fig 14). In these cases operative removal of the head of the radius was the treatment of choice. Excision of the head of the radius is usually done through a postero-lateral incision between the extensor carpi ulnaris and the anconeus. The head and neck of the radius are well exposed through this opening enabling the excision to be done easily. It is necessary in this type of operation to conserve a portion of the diaphysis which goes to form the radio-ulnar articulation and to remove all the new bone that is formed, in cases where the orbicular ligament is torn it is sutured to prevent the later complication of the displacement of the upper end of the radius. In posterior dislocation of elbow excision of the head of the radius has to be done in cases where there is displacement of the head (see case No 36 and Fig 13), it should be done at the end of 3 weeks. In cases of dislocation of elbow associated with fractures of the head of the radius the dislocation is reduced first and if the fracture is of the fissured variety, the treatment indicated is the same as for fissured fractures and is the identical method of treatment

employed by the author (5) for dislocation of the elbow. In fractures of the upper third of the ulna associated with fractures of the head of the radius the treatment adopted is the same. In those cases where there is marked displacement of the head, operative removal of the head of the radius is done at the end of 3 weeks.

POINTS OF INTEREST

(1) Various types of fracture have been classified. The marginal fissured fractures give very little trouble except the development of osteo-arthritis changes not incapacitating a person. Fractures which are comminuted, require operative removal of the head which is generally done after 2 weeks when the swelling has subsided and healing process has started.

(2) In cases of fractures of the neck of the radius where there is no displacement good firm union takes place with no subsequent trouble. In those cases where there is displacement, replacement is indicated but in all old cases of malunion of the fracture, it is better to remove the head.

(3) No immediate or late complications of nerve involvement have been noticed in any of the cases under review.

(4) The result of excision of the head of the radius has been found to be good from the replies that have been received. Follow-up radiographs have not been possible to show the condition of upper end of radius after excision in this type of injury. In another type of cases where the excision of the radial head had to be done for persistent posterior dislocation associated with an old fracture of the middle of ulna, it has been found on follow-up that the head is reformed illustrating Wolff's law of 'Adaptation of structure to function'. Kini (6)

My thanks are due to Dr P Kesavaswami, Radiologist for the photographs.

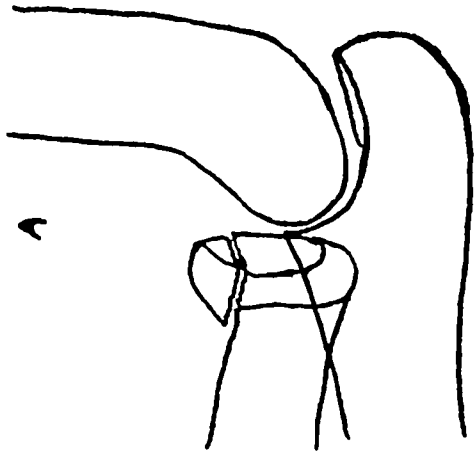


Fig 1

D



Fig 2

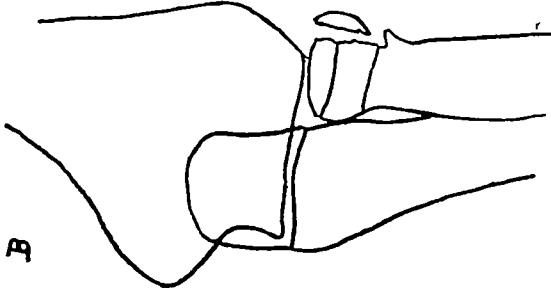


Fig 3

B

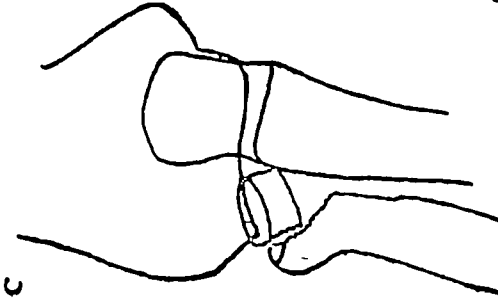


Fig 4

C

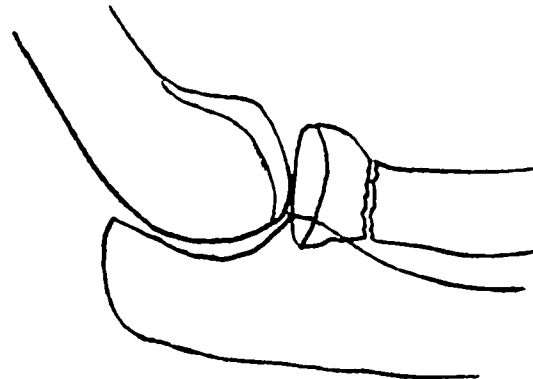


Fig 5

E

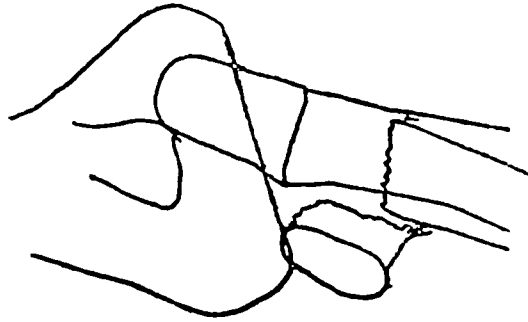


Fig 6

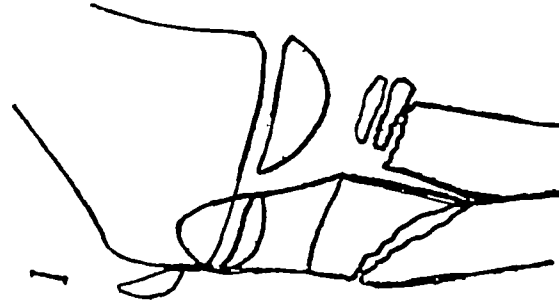


Fig 7

I

G

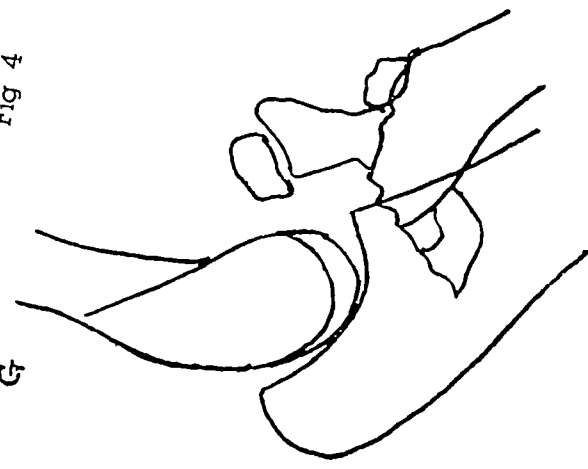


Fig. 8

G

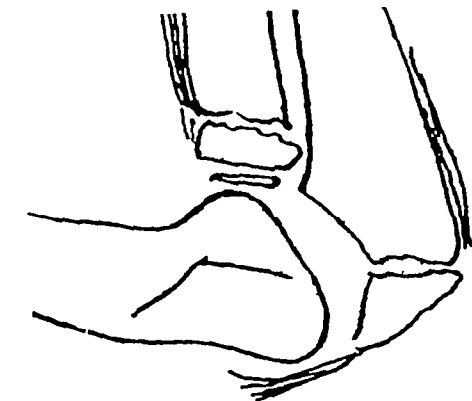


Fig 9

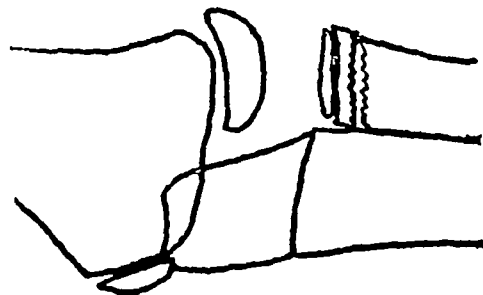


Fig 10

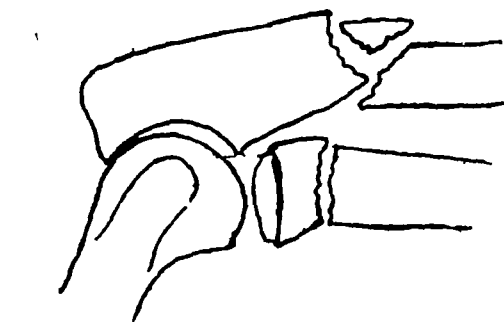


Fig 11

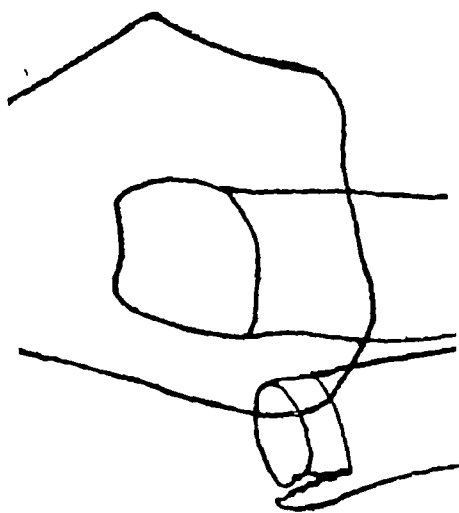


Fig 12

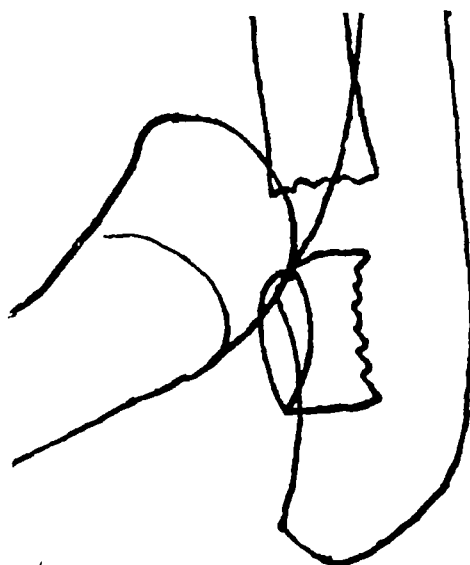


Fig. 13



Fig 14

S No	Religion & Sex	Age in years	Duration	Cause of injury and side of injury	X Ray findings	Treatment adopted	Result
1930							
1	H F	55	1 day	Fall on the right side by tripping over a stone. Admitted for pain and swelling around the right elbow	Fracture upper third of ulna and neck of radius	Limb put in flexion to a right angle in plaster of Paris in supination for 4 weeks	Not known
2	H M	40	5 months	Fall from a bullock cart which over-turned. Admitted for limitation of movements of right elbow. extension 110 deg, flexion normal, supination limited, head of radius prominent, grating felt on movement of radio-humeral joint.	Old fracture neck of the radius with formation of osteophytic growth and showing ossification of medial collateral ligament	Advised active movements and massage	No reply to the letter sent on 11-2-39
3	H F	20	2 weeks	History of a fall from a height. Admitted for pain and swelling of the right elbow	Oblique medial humeral fracture of the head of the radius with displacement of the fragment	Did not undergo treatment	Not known
4	I Ch M	48	1 day	Fall from a carriage which capsized. Admitted for swelling of the rt elbow with an abrasion on the outer side	Marginal fissured fracture of the head of the radius with displacement of the fragment upwards	Limb put in flexion to a right angle in plaster of Paris in supination. Plaster removed at the end of 2 weeks as he wanted it to be removed and subsequently he went to a bone setter	Not known
5	H M ch	13	2 days	Fall from a parallel bar. Admitted for swelling and pain round the left elbow	Green-stick fracture of the neck of the radius at metaphysial end	Limb put in flexion to a right angle in plaster of Paris in supination. He was discharged cured after a month's rest and treatment	No reply to a letter written on 2-9-39.

No	Religion & Sex	Age in years	Duration	Cause of injury and side of injury	X-Ray findings	Treatment adopted	Result
6	H M	Not known	Not known	Fall from a height Admitted for swelling and pain round the left elbow	Marginal fissured fracture of the anterior margin of the head of the radius without displacement	Did not undergo any treatment	No reply received
7	H M	22	2 months	History of a fall on outstretched hand Admitted for limitation of extension by 40 deg, flexion limited by 10 deg, and arthritis of right radio-humeral joint	Consolidation of the anterior marginal fracture with formation of a spur fixed to the head of the radius Calcification of the medial and lateral ligaments also noted	Limb put in flexion in plaster of Paris for 2 months	Did not report afterwards
8	H F	40	10 days	History of a fall on the outer side of the elbow Admitted with exaggerated cubitus valgus deformity and limitation of flexion and extension and painful left radio-humeral joint	Marginal fissured fracture with slight displacement and formation of a spur of bone at the neck of the radius	Limb put in plaster in acute flexion in supination At the time of discharge pain and swelling had subsided with improvement in range of movement Address being imperfect no letter was written,	Not known
9	H M	37	1 month	History of fall from motor cycle	Shows bony block in front of head of left radius with fracture of neck of radius with displacement	Flexion and plaster	Not known
1931							
10	I Ch M	40	7 days	History of a fall from cycle with elbow slightly flexed Admitted for swelling of the left elbow with limitation of extension and flexion and tenderness over the radio humeral joint, supination being very painful	Marginal fissured fracture of the head of the radius with no displacement	Limb put in acute flexion in plaster with forearm in supination	No reply has been received to a letter written on 11-2-39

1931 (Contd)

11	H M Ch	8	1 day	Admitted with a history of a fall on the right elbow with swelling extending up to the upper third of the forearm supination being very painful and tender over the radio humeral joint	Green stick fracture at metaphysal end of the neck of the radius with very slight displacement	Manipulated with very good result Limb put in acute flexion in plaster with forearm in supination	Very good at the time of discharge No reply has been received to a letter written on 11-2-39
12	H F Ch	9	1 month	History of fall on the left elbow Admitted for cubitus valgus deformity with limitation of extension, flexion and supination and pain at the radio humeral joint	Green-stick fracture at metaphysal end of the neck of the radius Fracture tip of the olecranon showing marked new bone formation over the upper end of the ulna, head and neck of radius and posterior aspect of lower end of humerus	Under anaesthesia, acute flexion with forearm in supination and plaster At time of discharge flexion 45 deg extension 140 deg Advised active movements	No reply
13	H M	21	1 day	History of a fall from a stair-case, height of 8 feet came sliding down on the right side Admitted for swelling round the right elbow and over the right forearm	Fracture of the upper third of the ulna and fracture of the neck of radius at metaphysal end	Limb put in flexion to a right angle with forearm in supination and plaster At the end of one month flexion complete, extension 160 deg, supination very markedly improved Advised active movements,	No reply
14	H M Ch	8	15 days	History of a fall from a cot Admitted for pain in the left elbow with limitation of supination	Green-stick fracture at metaphysal end of the neck of the radius	Limb put in acute flexion in plaster with forearm in supination At the end of one month very good result	Replied to a letter dated 6-4-39 States that the boy has no deformity and looks normal in all respects Result good

1931 (Contd)

S No	Religion & Sex	Age in years	Duration	Cause of injury and side of injury	X-Ray findings	Treatment adopted	Result
15	H M	45	2 months	Admitted with a history of a fall from a ladder with pain and swelling and limitation of movements at the left elbow and the radio humeral joint	Comminuted fracture of the head of the radius with displacement and marked new bone formation at the upper end of the radius and slight calcification of the inter-nal lateral ligament	Excision of the head of the radius was done and the result at the time of discharge was good No reply to a letter written on 11-2-39	Good at time of discharge
16	H M	16	2 months	Admitted with a history of a fall from a mango tree with limitation of movements at the left elbow and persistent posterior dislocation of the elbow	Persistent posterior dislocation of the left elbow with fracture of the neck of the radius	Advised excision of the head of the radius but did not undergo treatment	Not known
17	A I M	34	6 months	Admitted for cubitus valgus deformity, arthritis of the right radio-humeral joint, limitation of flexion to 60 deg and extension to 140 deg result of a motor car accident and fall on the right outstretched hand	Marginal fissured fracture of the head of the radius with marked calcification of the internal and external lateral ligaments	Excision of the head of the radius was done and subsequently his pain increased His Wassermann was strong positive and after treatment for specific infection his elbow movements improved	In a letter dated 4-7-39 he states that flexion is not complete, but he can do the work of a signaller on the railway and he is able to pull levers of the signals with any pain
18	I Ch M	28	11 days	History of a fall from a car (bus accident) Admitted for pain and swelling of the right elbow with tenderness at the radio-humeral joint Movement of the elbow were painful but possible	Fracture neck of the radius without displacement	Limb put in flexion with forearm in supination to a right angle in plaster At the end of one month complete flexion and extension and very good movements	Good Letter written on 11-2-39 has been returned by D L O

1931 (Contd)

19	Md M	25	12 days	Admitted for limitation of movement at the right elbow History of a fall from his bed	Marginal fissured fracture of the head of the radius without displacement	Did not undergo any treatment	Not known
20	A I M	31	15 days	Admitted for swelling of the right elbow, tenderness at the radio-humeral joint limitation of movement at the elbow Result of a motor cycle accident	Comminuted fracture of the head of the radius with marked displacement	Excision of the head of the radius and at the end of one month extension to 170 deg, flexion to 45 deg Advised active movements	Good at time of discharge Reported good result
21	Md M	34	1 day	History of a fall from parallel bars on outstretched hand Admitted for swelling of the right elbow with tenderness over the radio-humeral joint and limitation of movement at the elbow and specially supination	Fracture of the neck of radius without displacement	Limb put in flexion with forearm in supination in plaster for 3 weeks At the end of 3rd week, plaster removed and active movement and massage instituted	Very good at the time of discharge No reply has been received to a letter written on 9-2-39
22	H F	28	3 days	Admitted with a history of a fall as result of upturning of the bullock cart Admitted for swelling of the right elbow with limitation of movement at the elbow and radio-humeral joint	Marginal fissured fracture of the outer margin of the head of the radius without displacement	Limb put in acute flexion with forearm in supination and subsequently he did not attend the clinic	Letter written on 9-2-39 has been returned from D L O Result not known
23	A I F	39	1 day	Admitted for dislocation of right elbow, result of a fall due to slipping on a plantain skin with swelling and loss of function	Posterior dislocation of right elbow with fracture of neck of radius with displacement.	First reduction After a week excision of head of radius	Very good at time of discharge No reply to a letter

No	Religion & Sex	Age in years	Duration	Cause of injury and side of injury	X-Ray findings	Treatment adopted	Result
1932							
24	H M	18	2 hours	Admitted for swelling round right elbow with loss of function result of a fall due to cycle accident. On examination a dislocation was found	Posterior and lateral dislocation of elbow with marginal fissured fracture of head of radius	Reduction under anaesthesia and plaster casing for elbow in flexion and forearm in supination	Good at time of discharge Address not known
1934							
25	H F Ch	4	4 days	Admitted with a history of a fall. Swelling more marked at the right radio-humeral joint and the back of the elbow	Crack fracture of the upper 1/3 of the right ulna and fracture of the neck of the radius at metaphysal end	Limb put in flexion and full supination at a right angle in plaster of Paris	Very good at time of discharge. Incomplete address and so no letter was written
26	H M	46	2 months	History of a fall from a cycle with slight limitation of movements at the right elbow and marked pain during supination	Fracture neck of the radius with displacement	Excision of the head of the radius was done and result at time of discharge very good	Good On 22.3.39 he reported and elbow movements were as good as normal with slight exaggeration of cubitus valgus deformity. Doctor by profession
27	H M	18	2 hours	Cycle accident left elbow	Posterior dislocation of elbow with crack fracture of head of radius	Reduction and plaster	Very good at time of discharge
1935							
28	A I M	17	2 months	Admitted with a history of a fall from a height of 3 feet with exaggeration of cubitus valgus deformity and limitation of extension and flexion, supination markedly limited at the right elbow	Old healed oblique fracture of the neck of the radius. The radio-humeral joint showed osteoarthritic changes	Excision of the head of the radius was done and subsequently fracture of the ulna was done to compensate the exaggeration of the cubitus valgus deformity. At time of discharge flexion and extension were good	Good at time of discharge. Reported by his sister saying result good

1936

29	A I M	64	1 day	History of a fall due to slipping on the side of the left elbow Admitted with a swelling round the elbow joint and tenderness over the radio-humeral joint with limitation of movements at the elbow and marked limitation of supination	Fracture of the neck of the radius with displacement	Limb put in flexion with forearm in supination in plaster	After one month there was marked pain during supination He was advised excision of the head of the radius Never came back again for operative treatment Result not known
30	Md M	20	9 days	Admitted with a history of a bus accident He held on to the bar of the bus while moving and as it was moving he heard a crack resulting in a swelling of the elbow and marked pain and tenderness over the lateral side of the left elbow Move ments at the elbow were normal	Fracture of neck of radius	Put in plaster with elbow at right angle and forearm in supination	Not known

31	H M	45	Few hours	Fall on the left side from a railway engine	Posterior dislocation of elbow with marginal fracture head of radius	Reduction of dislocation and plaster of Pains splints with forearm in supination and elbow in flexion	Reported very good functional result
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1937

32	H M.	18	1 day	Admitted with a history of a fall from a cycle with swelling round the right elbow and pain during movements of the elbow and supination	Fracture neck of radius	Limb put in flexion to 90° with the forearm in supination in plaster	Good.
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1937 (Contd.)

S No	Religion & Sex	Age in years	Duration	Cause of injury and side of injury	X-Ray findings	Treatment adopted	Result
33	H F	32	5 months	Admitted for loss of movement particularly supination at right elbow due to a fall from a raised platform. History of a dislocation which was reduced outside and later loss of movement at right elbow	Oblique fracture extending from neck to the lower level of bicipital tuberosity and myositis ossificans and history of reduction of dislocation	Excision of head of radius, later excision of elbow	Very good result
34	H M	35	24 hours	Admitted for swelling of left elbow due to falling back	Shows fracture neck of radius without displacement	Reduction and plaster	Not known
1938							
35	H M	25	1 day	Admitted with a history of swelling and inability to use the right elbow joint due to a fall from a cycle, resulting in swelling and inability to move the elbow. The swelling extended to the middle of the forearm from the elbow	Fracture of the neck of the radius with slight displacement	Elbow put in plaster with forearm in supination at an angle of 90 degs	Flexion & extension at the elbow were complete. There was marked creaking of radio-humeral joint with exaggeration of cubitus valgus deformity
36	I Ch F	30	1 day	Admitted for swelling and pain over the right elbow due to a fall on the outstretched hand	Crack fracture of the neck of the radius without displacement	Elbow put in plaster with forearm in supination at an angle of 90 degs	Good. After 8 months the patient writes that the movements at the elbow are normal
37	H M	35	Few	Admitted for swelling, pain round the elbow more marked at the radio-humeral joint of the right elbow. History of tripping and falling forward on outstretched hand	Marginal fissured fracture of the head of the radius in front	Limb put in plaster in flexion at an angle of 90 degs, with forearm in supination	Good. Complains of occasional aches in the radio-humeral joint while playing tennis

38	H M	40	1 month	Admitted for limitation of movements at the right elbow, result of a fall on out stretched arm	Hem fracture of the head of the radius with displacement	Excision of the head of radius	Patient replies after 8 months saying that the movements at the elbow are normal
1939							
39	H M Ch	11	4 days	Admitted for pain and swelling in the region of the left elbow result of a fall from one of the boats on the beach	Green-stick fracture of neck of radius at metaphyseal end	Limb put in flexion with forearm in supination in plaster	Good at time of discharge

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POSTERIOR DISLOCATION OF UPPER END OF RADIUS WITH FRACTURE MIDDLE OF SHAFT OF ULNA

By

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Dislocation of the upper end of the radius is usually associated with a fracture of the upper third of the ulna. Generally in these cases the dislocation is of an anterior type. Posterior dislocations of the head of the radius associated with fracture of the ulna are rare, and the following case is interesting from the point of view of treatment. In addition the interest is greater because 6 years later he was admitted for a fracture of the skull and of the radius in the same forearm as the original injury and illustrates the clinical symptomatology of a marked fissured fracture in the occipital region and the result of conservative treatment —

of a fall from a height of 12 feet from the house top while thatching his house. The slipping down of a beam caused his fall. He was not able to say how the fracture occurred as he was unconscious after the accident for one day. On examination it was found that the upper end of the left radius was dislocated backwards and slightly upward and outwards (Fig 1) with a bend in the middle of the left forearm with some callus formation about the middle of the left ulna. X-Ray showed a fracture of the middle of the shaft of left ulna with marked overriding of fragments and backward, upward and outward dislocation of the upper end of left radius (Fig 2). A closed reduction



Fig 1



Fig 2

A Hindu male aged 40 years was admitted in 1933 for limitation of movement at the elbow of 2 weeks duration with a history

was attempted but proved a failure. A subsequent open reduction of the dislocation was done under general anaesthesia but it

was difficult to get any increased range of movement after completion of reduction. So an excision of the head of the radius was done which improved the movements at the elbow. With a small incision over the fracture in the ulna the over-riding fragments were levered into position and reduction of the fracture done. After reduction the limb was put in plaster with the elbow in flexion at a right angle and the forearm in supination. The patient was discharged cured and replied on enquiry that the functional result of the elbow was good but he did not turn up for inspection to allow a study of the clinical result.

In February 1939 he was admitted unconscious for an injury of the skull and an injury of the left forearm. This was the result of a quarrel and the infliction of a blow with a blunt instrument on the back of his head and forearm, and there were several bruises due to blows by fists. At the time of admission he had a black eye and a contused wound on the back of his head over the occipital bone with no evidence of

irritability increased when the injured side of the head was being palpated. On radiological examination of the skull, a fissured fracture running transversely just 2 inches above the occipital protuberance was found (Fig 3). An oblique fracture of the left radius at the junction of the middle and lower third was also found in the same forearm where he had previously sustained a posterior and lateral



Fig 3

any paralysis of cerebral nerves, centres or tracts. He was unconscious and very irritable with markedly contracted pupils. The



Fig 4

dislocation of the head of the radius with fracture of the middle of the shaft of the ulna. He was treated on conservative lines for

the head injury from which he completely recovered at the end of 3 weeks. The fracture was set in a plaster of Paris splint and before discharge from hospital an X-Ray of the left elbow was taken to find out the condition after the old excision of head of radius. Re-X-ray showed reformation of the head of the radius and firm union of old fracture of ulna. Adaptation of structure to function was well illustrated by the reformation of the head of the radius, (Fig 4). On enquiry six months after the second accident, the patient states that he is well except for numbness in the region of jaw and back of his head and deafness of his right ear and slight weakness of his left forearm which had sustained injury for a second time preventing him lifting heavy weights.

Views regarding the ultimate result of excision of the head of the radius are varied. Cotton (1) was of opinion that in children if an excision is done there would be disturbance of growth because of the inclusion of the epiphysial line in the removed bone. Magnuson (4) advised against radial head removal in growing individuals but he believed that if removal of heads of radius was done in adults it did not disturb function. Speed (6) and Conwell (2) felt that after removal of the head of radius there was likelihood of new bone formation. King (7) in his review of the follow up of 13 cases showed that in the majority of the cases 'Proximal displacement of the radial shaft with widening of the distal radio-ulnar joint with production of pain, weakness and tenderness at this point and prominence of the lower end of the ulna at the wrist limiting the ulnar deviation at the wrist and resulting in radial deviation of the hand'. In the majority of his cases the head of radius was removed before the growth of bone was complete. This case illustrates that resection of the radial head in adults does not inter-

fere with function and is an example of Wolff's law of "Adaptation of structure to function". It has been found in cases of fractures of head of the radius where resection has been done that restoration of function was the rule. (Kini 3)

POINTS OF INTEREST

(1) The occurrence of a posterolateral dislocation associated with a fracture of the middle of the shaft of the ulna.

(2) Excision of the head of the radius has given a good functional elbow for an old unreduced dislocation. The reformation of the head of the radius is an example of Wolff's law of 'Adaptation of structure to function'.

(3) A remarkable fissured fracture on the back of the skull with very little damage to cerebral centres is noteworthy. Conservative treatment was tried with success.

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The 3rd Annual Conference of the Association of Surgeons of India will be held at New Delhi on 9th, 10th, 11th and 12th April 1941

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THE INDIAN JOURNAL OF SURGERY

Vol II

DECEMBER 1940

No 4

तालयन्त्रे — द्वादशाङ्गुले मत्स्यतालवदेकताल ।

द्वितालके, कर्णनासानाडीगल्यानामाहरणार्थम् ॥ १२ ॥

—सुश्रुतव्याख्याया सूत्रस्थाने सप्तमोऽध्यायः ॥

Scoops are twelve anguls long and are of two kinds, one ended and two ended The ends have an expansion like the scale of a fish They are used to remove foreign bodies from the ear and the nose and from sinuses

—SUSHRUTA SAMHITA SUTRASTHĀNA
Seventh Chapter, XII Verse

TUMOURS OF THE SPINAL CORD

BY

MR M G KINI, M C , M B , M CH (ORTH), F R C S (EDIN), SURGEON,

AND

DR P ARUNACHALAM, M D , M R C P (LOND), T D D (WALES),

PHYSICIAN, KING GEORGE HOSPITAL, VIZAGAPATAM, (S INDIA)

Spinal cord tumours are very rare in Northern Circars From 1932 to 1940 only 3 cases have been diagnosed as spinal cord tumour of which one has been already published (Kini and Kesavaswami) ¹¹ One case of extra medullary spinal tumour was found in addition in the cauda equina region at post-mortem It was an elongated, mamillated growth occupying the whole of the cauda equina region On histo-pathological examination it was found to be a neurofibroma Clinically it was diagnosed as transverse myelitis He was admitted in a very bad condition and he died suddenly before lipiodol injection in the spine could be done A glance at the history of spinal cord tumour shows the variety of names by which it has been called Cruveilhier (1835) called it "tumeurs cancéreuses des meninges" Paget called it "Myeloid tumour" Virchow called it a "Psammoma" because he observed sand bodies on the cut surface of the tumour His and Golgi called it "Endothelioma" Robin suggested the name of "Epithelioma" The tissue of origin of these tumours usually was disputed but Schmidt and Bland Sutton upheld the arachnoidal origin of the endotheliomas Later Mallory and Cushing have verified the origin and found it to be from the arachnoid and called it a "Meningioma" Learmonth¹² chose the word "Leptomeningioma" as a compromise until the embryological controversy about the origin of the arachnoid is decided It is interesting to observe that when Gower and Victor Horsley for the first time in 1887 removed a tumour of the spinal cord, it set the whole of the surgical world agog

Pathological Anatomy

Spinal cord tumours are usually classified topographically as follows —

(1) *Extra-dural tumours*

- (a) Arising in the neural arches of the vertebrae
- (b) Arising in the bodies of the vertebrae
- (c) Arising in the extra-dural fat

(2) *Intra-dural tumours*

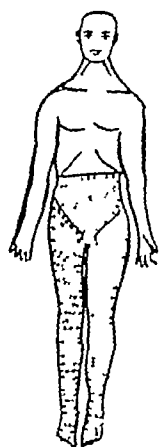
- (a) Extra-medullary
- (b) Intra-medullary

Spinal cord tumours are of interest to the Surgeon because in tumours of the extra-medullary type which are of a benign nature, operative removal

has led to dramatic successes. Recovery from paralysis has been very quick in some cases, while in others it has been slow. In the author's (Kini) experience the first case recovered in 40 days after the removal of the tumour, in this case the tumour was found at the level of the 9th thoracic vertebra- (Kini and Kesavaswami). In the case reported in this paper, the period of recovery was delayed. The following is the history —

A Hindu male cooly aged 35 years was transferred from the Medical side as a case of spinal tumour. There was nothing of interest to note with regard to the family history. He was married and had no children. He gave a history of gonorrhoea and syphilis one year before admission and no history of injury to the spine. He was admitted on the Medical side with a history of severe shooting pain down the legs 9 months prior to his admission. He used to get muscle cramps and flexion of the right knee associated with severe pain greater on the right than on the left lower limb. One day while walking, his legs gave way all of a sudden and he fell flat on the ground. He was given Ayurvedic treatment with no benefit and developed complete paralysis of both legs after an interval of 2 months. His respiratory and circulatory systems were found to be normal.

Nervous System



Sketch showing
level of
anaesthesia

- (1) Cerebral functions including cranial nerves were found to be normal
- (2) All motor and sensory nerves of the upper limbs were found to be normal. Spasticity of the lower abdominal muscles and of the lower limbs with paralysis was found. Flexor spasm at the knees and hips was marked.
- (3) *Sensory functions*—Tactile sensibility, sensibility to pain, thermal sensibility and posterior column sensibility were dull all over the limbs and up to a level two inches below the xiphoid cartilage. (See line diagram)
- (4) *Reflexes*—Cremasteric and abdominal reflexes were lost. Plantar reflex was extensor on both sides.

Deep reflexes—Knee and anklejerks were exaggerated

Organic reflexes—There was precipitate micturition and loss of control of anal sphincters. Trophic disturbances were absent. There was no local rigidity or tenderness over the spinal area.

Special Investigations

Lumbar puncture (Froin's Syndrome present)

Biochemical report showed Protein 540 mgs per 100 c c

Globulin ++

Chloride 710 mgs



Fig 1a Radiograph, anteroposterior view, showing lipiodol in the spinal canal with block at the level of the 4th dorsal vertebra

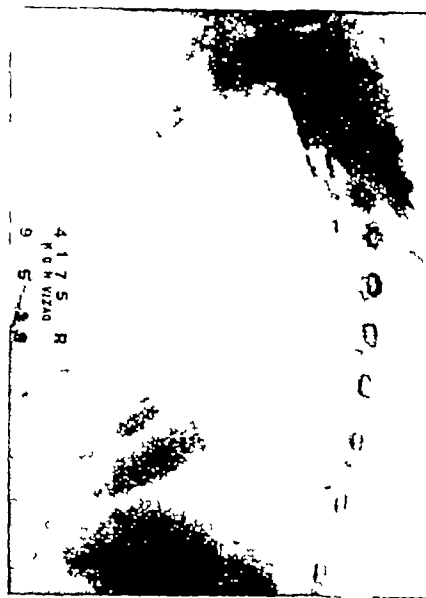


Fig 1b Lateral view of the same

Wassermann = Doubtful even after provocative dose

Lange's test = 0000001221

Cistern puncture showed a block at the level of the 3rd dorsal vertebra (See Fig 1)

Pilocarpine test showed sweating about the level of the 6th dorsal segment, no sweating below the 7th segment

He was given anti-syphilitic treatment for a time with no improvement. He was operated on on 1-4-1939 under ethyl chloride, gas, oxygen and ether anaesthesia. Laminectomy of the 4th and 5th dorsal vertebrae was done. The extra-medullary tumour situated postero-laterally on the right side midway between the 6th and 5th laminae was easily removed.



Fig 2 Photographs of the specimen removed

Dur mater was sutured and muscles and wound sutured in layers. Posterior plaster slab-spinal support was given. The patient made an uneventful recovery and the wound healed by first intention.

Pathological Report

Size of the tumour—Length 1.4 cms, breadth 0.7 cms (Fig 2)

Section shows elongated cells with pale oval nuclei. In places the cells are arranged in whorls, showing concentric lamination. There are numerous cavernous vascular spaces. The histology is that of vascular Meningioma (Fig 3)

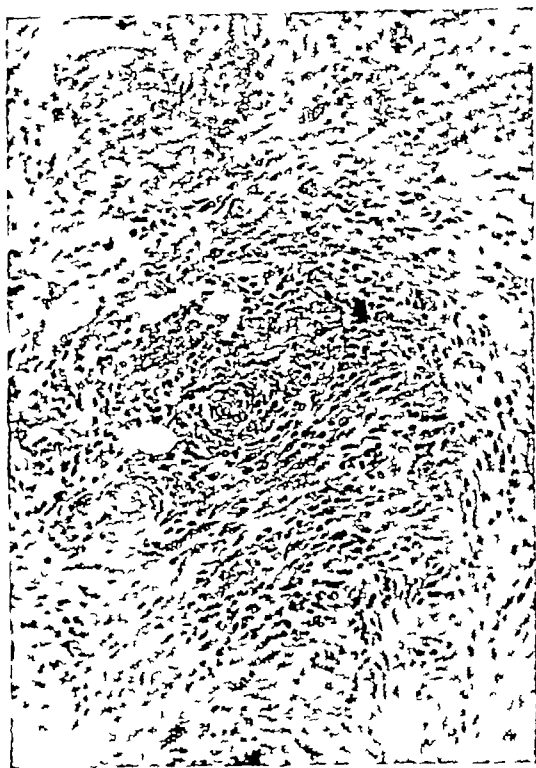


Fig 3 Micro photograph showing Pathological changes described

In the other case which was diagnosed as a spinal tumour in a child aged 8 years there was marked hyperaesthesia of limbs. In the usual routine examination, lumbar puncture was done and was found to be dry and repeated attempts showed the same result. Later cistern puncture was done and 1 c.c. lipiodol injected. A block at the level of the 12th dorsal vertebra was found (Fig 4). This case is just mentioned to show that routine systematic examination may bring to light more tumours of the spinal cord. It is unfortunate that after the diagnosis the parents refused operative interference, and hence the case is not reported in detail.



Fig 4 Radiographs, A P and lateral showing Lipiodol in the spinal Canal with block at the level of the 12th dorsal vertebra.

In the case which was diagnosed as a spinal tumour, post-mortem, the history was —

A Hindu male aged 27 years was admitted for transverse myelitis with inability to use the two lower extremities. He was married and had one child 1½ months before admission he had an attack of fever lasting 8 days. He got better on taking Ayurvedic medicine.

During the convalescence of the above mentioned fever the patient noticed that he was weak on his feet. One month before admission he was completely disabled and could not use the two lower extremities at all. There was tingling and numbness of the lower extremities and he had no control over his sphincters. Bladder was distended and urine was dribbling. Ten days before admission he had oedema of the ankles and dorsum of the feet.

Urine contained pus cells.

Blood pressure was 105/75 and the heart sounds were feeble but borders were normal.

X-Ray of spine showed nothing abnormal in the vertebrae and their articulations.

Wassermann Report —

Blood strong positive

C S F strong positive

Report on C S F —

(1) Protein	700 mg per 100 c cs of fluid
(2) Globulin	++
(3) Chloride	650 mg ,, ,,
(4) Sugar	42.7 mg
(5) Cells	4 per cmm

Blood film examination showed no malarial parasites W B C 18,800

He was a poorly nourished individual, slightly jaundiced, no cyanosis, tongue moist, slightly coated and pigmented at the margins Teeth clean and normal, no pyorrhoea alveolaris present Oedema of the ankles and dorsum of the feet present

Abdomen felt normal except in the hypogastric region where the bladder was found distended to the umbilicus

Nervous System.—Intelligence normal Cranial nerves were normal Pupils were equal and normal in size and shape, and reacting to light and accommodation No nystagmus was present Muscles of the lower extremities were wasted and flaccid and could not be moved actively The upper extremity was normal

Sensations —

Subjective—Tingling and numbness below the region of the umbilicus and of the lower extremities

Objective—Pin prick, cotton wool, heat and cold sensations lost in the above mentioned regions Vibratory, joint, tendon and muscle sensations lost in the same region

Jerks and reflexes—Knee jerk, and ankle jerk lost on both sides Abdominal reflexes present and brisk

Plantar reflex—Left doubtful, right not elicited

Organic reflexes—Loss of control over bladder and rectum He had distension with overflow, not an automatic bladder

He died suddenly and on post-mortem examination the following were found —

- (1) Emaciation
- (2) Caudal tumour (neuro fibroma)
- (3) Ascending pyelonephritis, cystitis, dilatation of the right ureter and pelvis
- (4) A myxomatous patch in the mucus membrane of the colon
- (5) Hypostatic congestion of lungs
- (6) Sub-acute septic splenomegaly

Death due to toxæmia from ascending suppurative pyelonephritis and cystitis

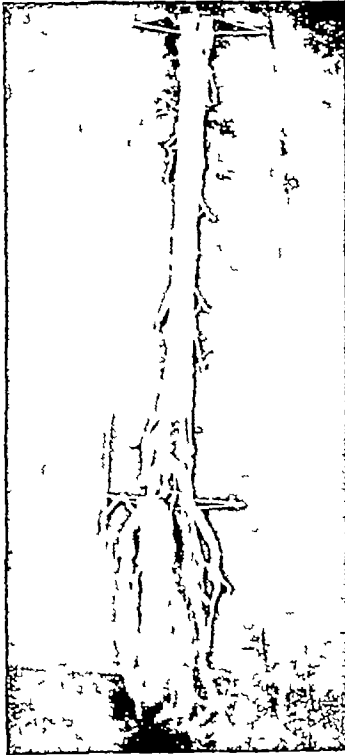


Fig 5 Specimen showing the growth in the region of the cauda equina



Fig 6 Clinical photograph taken just before discharge

Description of the Specimen

Spinal cord showing an oval flattened irregularly mamillated pinkish grey growth about 3" by 1½" occupying the posterior part of the cauda equina. The membranes are not adherent to the tumour. The veins above the tumour are tortuous and engorged. The nerves are spread out anteriorly and to the right of the tumour and some appear to be adherent to it (Fig 5)

Microscopical section—Neuro-fibroma

Points of Interest

(1) Extra-medullary tumours when they arise give rise to three distinct clinical cycles as mentioned in text-books —

- (a) Root cycle
- (b) Brown-Sequard syndrome
- (c) Paralytic syndrome due to pressure

In the case above reported which was operated on the patient had root cycle at the commencement with shooting pain down the legs. The patient was admitted in the stage of paralysis and the Brown-Sequard syndrome stage must have passed before admission to hospital. A small tumour was found at the level of the 4th dorsal vertebra which on histo-pathological examination proved to be a meningioma.

(2) Recovery was slow and he was undergoing physio-therapeutic treatment for 13 months in the hospital before he was able to get about by himself (Fig 6). In this case the changes in the spinal cord must have occurred to a greater extent due to pressure by the tumour which was situated in the narrowest part of the spinal canal. At the time of discharge he had still some loss of sensation in the lower limbs with diminished control of organic sphincteric reflexes and spastic condition of his lower limbs.

(3) In the second case, a spinal block was found but it is difficult to say whether it was due to a tumour as no operation was done.

The third case in this series was diagnosed as a spinal tumour only post-mortem. The clinical diagnosis was a transverse myelitis of the spinal cord. The patient died 11 days after admission due to uraemia as the genito-urinary system showed cystitis, ascending pyelo-nephritis, dilatation of the right ureter and pelvis. The interesting part of the history is the 1½ months' duration, paralysis was of one month's duration and was of the lower motor neuron type and the tumour was found in the cauda equina. Cauda equinal tumours can be silent for a long time and pressure symptoms come late in the disease as illustrated in this clinical history. The symptoms of paralysis corresponded to lower motor neuron paralysis on account of pressure on nerve roots. Though the tumour appears more to one side it caused paralysis of both limbs equally. The fever which the patient had prior to the development of paralysis was probably due to cystitis. The histo-pathology of this tumour was a neuro-fibroma.

Our thanks are due to Dr P Kesavaswami, Radiologist, King George Hospital, Vizagapatam for the X-Rays and photographs and to Dr T Bhas-kara Menon, M D, D Sc, F R C P, Professor of Pathology, Andhra Medical College, Vizagapatam, for the micro-photograph and for the pathological examination of the specimens and to Dr P Kutumbiah, M D, M R C P, for permitting to report his case of tumour in the cauda equina region.

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CONGENITAL TALIPES EQUINO-VARUS

BY

N S NARASIMHAN, F R C S (ENG),

ORTHOPAEDIC SURGEON, GENERAL HOSPITAL, MADRAS

Congenital talipes equino-varus is a common enough deformity, a consideration of the various facts elicited during the examination of 172 cases in my experience in the Madras General Hospital is of some value in discussing the etiological factors. A study has also been made of 117 specimens in the museum of the Government Hospital for Women and Children, Madras, with a view to elucidate the position of the feet at various

		This series of 172 cases	Robert Jones and Lovett (1929)	John Fraser (1926) 125 cases	Whitman (1930) 2103 cases	Isig Kert 1206 cases
1	Sex incidence	Males 120 69.8% Females 52 30.2%	Males 65% Females 35%	Males 72% Females 28%	64.4% males 35.6% females	66.1% males
2	Side affected	Bilateral 50% Unilateral 50% Right side 35 Left side 25 Side not noted in 26 cases	56.8% bilateral 43.2% unila- teral and both sides equally affected	49% bilateral Right side 17% Left side 24%	43.5% bilateral 30.4% right 26.1% left side	
3	Presentation during labour	Breech 5 rest cephalic with natural labour except in 4 cases				



Fig 7 Case A Photo of a female aged 8 showing talipes of the right foot with absent and deformed toes stages of intra-uterine life The clinical findings are given in tabular form below The detailed museum findings are given in the appendix

Trethowan	Albee	Ehrenfield and Ketch 1892	Little	Adams	Remarks
					All Statistics are agreed that congenital talipes is much more common among males than females, in this series there was one instance of a male child born after six female children with no hereditary history or other abnormalities
		78% labour normal			In two cases of extended breech in this series, the two upper limbs are stiff and both the wrists are adducted and palmar flexed NB—No case has been recorded in twins Since writing the paper, there is one instance of a male child among twins having bilateral talipes The other twin and the first born was a female baby with no talipes

		This series of 172 cases	Robert Jones and Lovett (1929)	John Fraser (1928) 125 cases	Whitaman (1930) 2103 cases	Isig Keit 1203 cases
4	Heredity	8.7% hereditary history	Factor in some cases	several generations of a family may be affected	occasional two or more children of the same mother suffer	
5	Other deformities in the family	Five cases			Nothing as a rule	
6	Presence of other deformities in the patient	17.5% No harelip or spina bifida	$\frac{1}{10}$ Cases	may be associated with other primary or secondary deformities	4% in 735 cases	
7	The patient's rank in the family	In 105 cases — I—31 II—20 III—15 IV—17 V—5 VI—3 VII—4 VIII—4 IX—1 X—3 XI—2	Relatively Common in multiple than in Single pregnancies			
8	Consanguinity of parents	In 25% of cases Sister's daughter maternal uncle's daughter				

Trethowan	Albee	Ehrenfield and Ketch 1892	Little	Adams	Remarks
Rarely a factor	occasionally familial		Traced it in four genera- tions	one case with five children, one nep- hew and one grand child with club foot	(a) mother's father, her brother and first child with talipes (b) mother's sister had four children with talipes (c) talipes in elder sister one, talipes in two other elder children in five inst- ances, talipes in one elder child in one instance, congenital dislocation of hip in elder brother in two instances (d) two children by first wife, father and youngest brother with talipes (e) two children of first wife with talipes in one instance (f) grand-father and younger uncle (g) talipes in elder brother
					The following conditions were observed in this series (a) mother rickety and with signs of toxic goitre in one case (b) parents have congenital syphilis in one case (c) only child of a comparatively aged mother in three instances (d) mother aged 14 only in one instance (e) mother's father had Dupuytren's contracture of both hands, mother had congenital contraction of the two little fingers
	Frequently present				
		30% were first born			

The other deformities referred to in column 6 in the patients in the present series are described in detail below —

Carmo-pedal spasm 2 (one of these two died of multiple abscesses)

Shortening of leg—1

Marked Dolico-Cephal—1

Contractures of leg—2

Talus and tibial epiphysis absent in 1 case

Absence of fibula—with only two toes—1

Absence of tibia—1

Contracture of palm with flexion of metacarpo-phalangeal and inter-phalangeal joints—1

Four toes present, four rudimentary, corn present, wasting of muscles of right leg and thigh, slight genuvalgum, shortening of right leg—1

Webbed fingers and toes, extraphalanx in one toe, circular groove in the lower third of left leg only in the soft parts, circular grooves in the bases of the fingers, plenty of fat in the sole of the foot—1

Absent and deformed toes—1

Genuvalgum—separation of malleoli $3\frac{1}{2}$ inches in 3 cases 1 inch in 2 cases, and $4\frac{1}{2}$ inches in 1 case

Foot drop with absent jerks—1

Deformity of both hands and undescended testis—2 cases

Flexion of knee and hip joints and contracture of flexor muscles—1 case

Phimosis—3 cases

Umbilical hernia—5

Co-existence of anterior polio-myelitis—1

Co-existence of congenital dislocation of hip—1

Shortening of left foot by one inch—1

Contracture fingers of both hands—1

Myotonia congenita—1

Contracture of all fingers of both hands, combined genuvalgum and recurvatum like congenital dislocation of knee of left side with talipes calcaneus—1

Contractures at both elbows with periostitis of thigh and legs—1

Genuvalgum and talipes calcaneus on the left side with T E V on right side—1

One case of spina bifida occulta

The clinical photos —

(A) of a case with absent and deformed toes,

(B) of congenital dislocation of both knees with deformities of both elbows, (radiograms and clinical photo),

(C) where fibula is absent and there are only two toes,

(D) where lower third of right tibia absent, fracture of the lower third of the fibula,

(E) of rigidity of both knees with abnormalities of fingers (three radiograms and one photo),

(F) of localised thickenings of the plantar aspect of the foot with hypertrophy of the leg and thigh,

(G) where talus and tibial epiphysis are absent,

(H) of stiff knees, bilateral talipes, one foot with four toes and claw hand, and

(I) bent tibia are presented.

Theories advanced to explain the causation of congenital talipes have to satisfy the occurrence of the deformity which can be completely corrected (a) in otherwise normal infants, (b) as a bilateral or unilateral affection, (c) more often in males than females, (d) more often in multiparae than in primiparae, (e) with a hereditary history in 8% of cases, (f) in families with other deformities occasionally, and (g) in association with other deformities in 17% of cases in this series

The following theories have been advanced from time to time —

- (1) Increased intra-uterine pressure (*i e*, Mechanical theory) The foot has from some cause remained for a longer or shorter time in a constrained or fixed position, and has thus grown into the deformity (Hippocrates, Julius Wolff, Albee, Parker and Dennis Browne)
- (2) Spasmodic muscular contraction of invertor muscles
- (3) Muscular maldevelopment
- (4) Congenital dislocation of the head of the talus out of the socket
- (5) Retardation of normal development (Atavistic theory)
- (6) Dysplasia of foot (Keith)



Fig 8 Case B Photo of a female showing deformities of both knees and elbows and bilateral T E V Figures 9 & 10 show radiographs of knees and elbows showing the nature of the deformities

(1) *Theory of increased intra-uterine pressure*—It is advanced on the assumption that the lower limbs in early intra-uterine life are abducted,

flexed and rotated outward, that the legs are crossed and that the feet are plantar flexed and abducted and that subsequently there is an inward rotation of the limbs. The foetal attitude was described by Eschriet (1851) and Berg (1882). The failure of rotation is denied by Bersal Hagen (1899) and Scudder (1887). So a study of the position of the feet of the foetuses in 117 museum specimens was undertaken and their position with a summary is given in appendix A. There is no essential relation between age of the foetus, the rotation of the limbs and the position of the feet. Radiological study of the position of the feet in utero in a large series of cases available in the Government Hospital for Women and Children was not helpful. John Fraser, Whitman and Dennis Brown regard the presence of marks, dimples or scars on the dorsum of the foot as evidence of intra-uterine pressure.

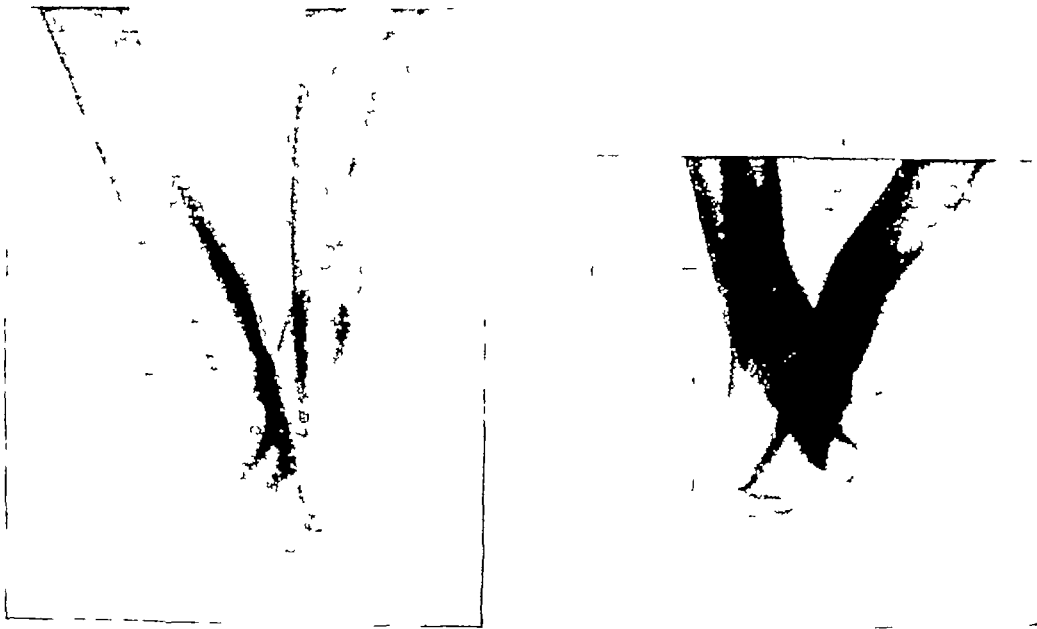


Fig 9

Five per cent of cases in this series showed dimples. Entanglement of the feet in the umbilical cord, direct pressure of extra-uterine or intra-uterine tumours and interlocking of the feet do produce restraint of movements.

The proofs of restraint or of abnormal attitude of the limbs in cases of club foot are (1) hyperextension or fixed flexion of the knees, (2) smallness and asymmetry of the foot, (3) absence of toes, spontaneous amputation and presence of constricting bands about the leg or foot, (4) combination with other deformities,

In my present series, there was fixed flexion of knee in five cases, asymmetry of the foot in two cases, absent toes in four cases, other defects in the body in five, structural defects in six cases and spina bifida occulta in one case

The extended breech cases showed fixed flexion of hips and stiff knees with talpes. On the other hand a male child delivered by Caesarean section showed fixed flexion of hips and knees without any talpes. There were four cases with rigidity of knees and fingers and two with deformity of elbows

There is no doubt that in a certain percentage of cases intra-uterine pressure operates but in a majority of cases mechanical pressure is not a factor

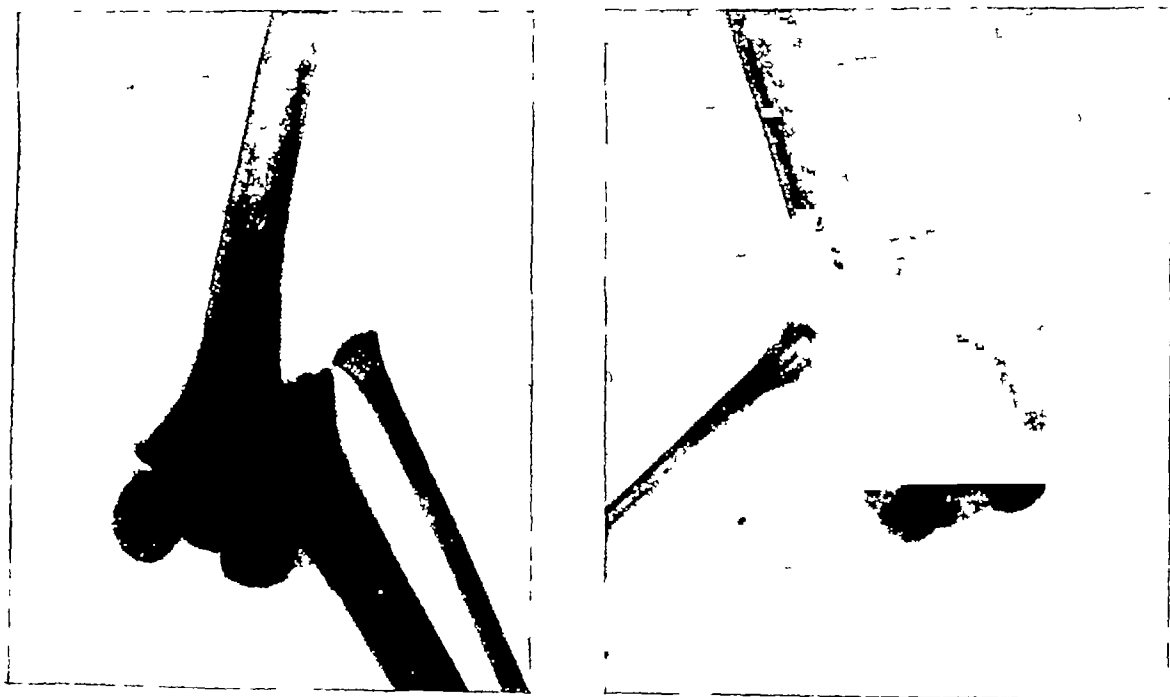


Fig 10

There is no proof that there actually exists any restriction of movement in utero as could be judged from museum specimens, by the classical sign of Ballotment in the early stages of pregnancy, by the presence of foetal movements and by radiological studies in the later stages of pregnancy. To explain the occurrence of unilateral deformities it is more difficult. In unilateral cases, the whole of the leg below the knee is slightly smaller in its dimensions, there were three cases with shortening of the leg and thinning of the leg muscles in this series

(2) *Spasmodic muscular theory*—Little and Adams confused the congenital talipes with the deformities caused by infantile paralysis and cases of spina bifida Parker and Shattock (1884) found the muscles and nerves normal histologically When the deformity has been properly corrected, the muscles carry out their function normally

(3) *Theory of muscular maldevelopment*—Failure of development of muscles and joints of limbs or absence of tibia or some of the toes is due to primary mesoblastic defect



Fig 11 Case C Photo of a male child with Talipes equinus with only two toes, radiograph showed absence of fibula

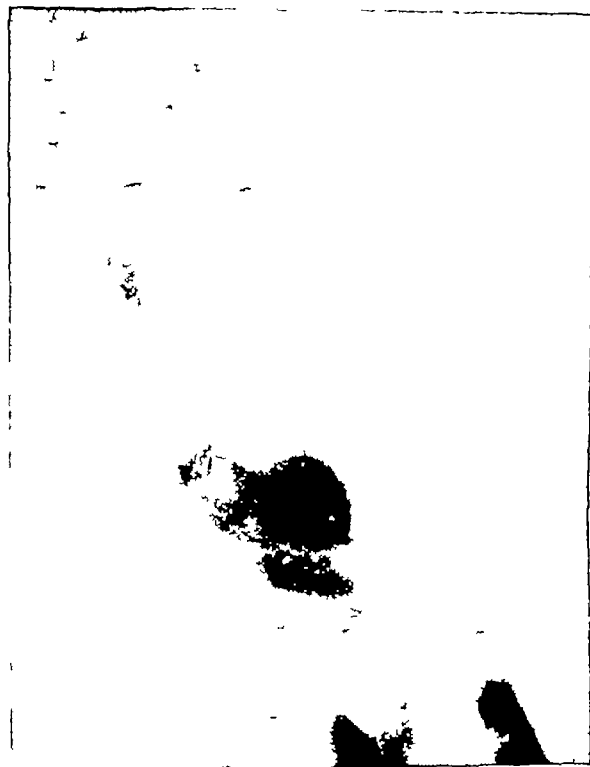


Fig 12 Case D Shows congenital absence of lower third of tibia and fracture of lower end of fibula

(4) *Congenital dislocation theory*—Radiological study of the feet would not show the actual dislocation, as the ossification of the navicular does not take place upto four years of age Trethowan and Brockman are in favour of the congenital dislocation theory, manipulative reduction and correction of the deformity or open operative correction lend support to this view But a congenitally dislocated hip is not rigid till after a long time, a congenitally dislocated knee can also be easily reduced into correct position, the fixation of deformity as noticed in congenital talipes is not present at such an early age in other congenital dislocations There was associated dislocation of the hip in one case and of the knees in two cases

(5) *Theory of arrest of development*—This theory assumes that clubfoot is due to arrested development at a stage corresponding to that of lower monkeys but the theory cannot explain the many different types of congenital talipes

(6) *Dysplasia of the foot*—The foot is a portion of the body which is undergoing rapid evolutionary changes. Before the ninth week of intra-uterine life the hind limb is converted into a recognisable hind foot and leg with separation of the previously conjoined toes. The pentadactyl limb is ingrained in the germ plasm. The development of a complete articular surface is also pre-destined and is not determined by the position in which the limb is held in utero.

Contracture of the outer two toes is very common as these digits are undergoing a rapid evolutionary change, in this series there were two instances of absent or deformed toes. The explanation of supernumerary digits is difficult but it may be regarded as a reversion to the multiple bones of the fish. Supernumerary digits tends to run in families and it is not due to local disturbance. There was one instance in this series of an extra phalanx in one toe in addition to webbed fingers and toes. Suppression of toes, congenital amputation of the toes, syndactyly and hypertrophy of the toes involving the soft parts or bones or both, all were met with in this series. Slight asymmetry, particularly shortening of the great toe is also common.

Keith (1940) in his discussion on certain congenital maldeformations refers to the work of Dr Hasley J Hagg in mice. By mating parents showing extreme degrees of dysplasia he obtained a high percentage of defectives. Keith's opinion is that congenital club foot in all its human forms is but one of the many ways in which Streeter's dysplasia becomes manifest. A high proportion of dysplasias of mice in Dr Hagg's work showed division of hallux or pollex. This is met with in the human also and in this series there was one instance. The onset of these disorders is in the sixth week of intra-uterine life.

Consanguinity of parents was elicited in 25% of cases in this series and the experimental work of Hagg and Haldane confirm the view that the most extreme eugenic measures should be taken with regard to the carriers of such abnormalities.

Summary of the findings of the position of the feet in
117 museum specimens details of which are given in the Appendix

EXAMINATION OF NORMAL FOETUSES (42)

In thirteen foetuses between eight and twelve weeks (two of which were twins), both feet were at right angles in 6 including the feet of one pair of twins, (in the other pair the right foot was inverted and the left

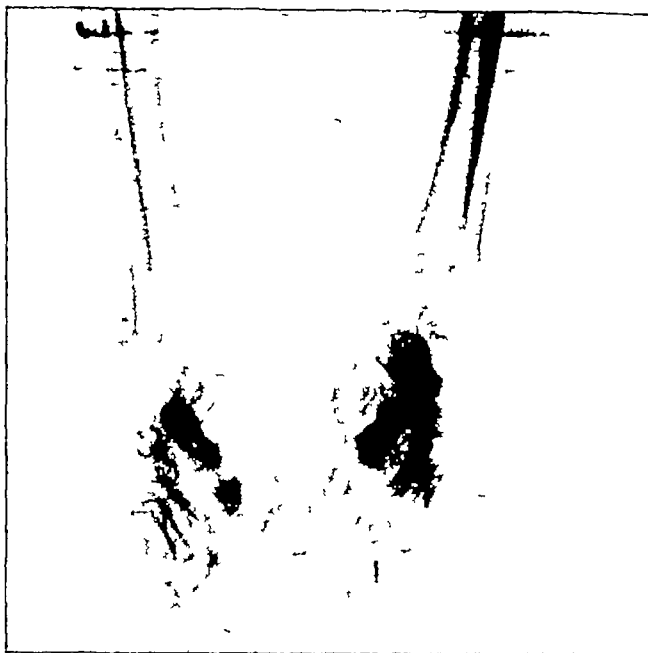


Fig 15 Case G Radiographs of both feet from a male child showing absence of tibial epiphysis and the talus on the right side

normal) The knees were straight in one and in another there was semi-flexion at thighs and knees, the position described by Echricht was present



Fig 16 Case H Photo of a female child with bilateral T E V shows a flexion contracture of the right wrist and hand (inset) and Stiffness of both knees

in one, in 6 other instances, the position varied, of these 6, Echricht's position was noticed in only one instance There was one instance of cord pressure on the back in the form of a groove and lateral flexion of the knee

Of seven foetuses between thirteen and sixteen weeks including one twin, the feet were at right angles in 2, in the twins they were inverted, there was crossing of the feet in one male and one female foetus with one foot inverted and the other everted

Of five foetuses between seventeen and twenty weeks, in 2 instances, feet were at right angles, in one of which membranes were intact, and the feet were not crossed, and in the other the cord was over the lower third of right leg, and dorsum of the left foot. The position varied in all the others, in one foetus where the feet were under the buttocks, the right foot was inverted and the left normal

Of 6 foetuses between twenty one and twenty four weeks, the feet were at right angles in one instance, in one case where the membranes were intact, both the feet were adducted, in another where the feet were under the buttocks, one foot was in equino-varus, the other was normal

Of the 9 foetuses between twenty five and twenty eight weeks including two instances of triplets, and two of shrivelled foetuses, the position of the feet varied

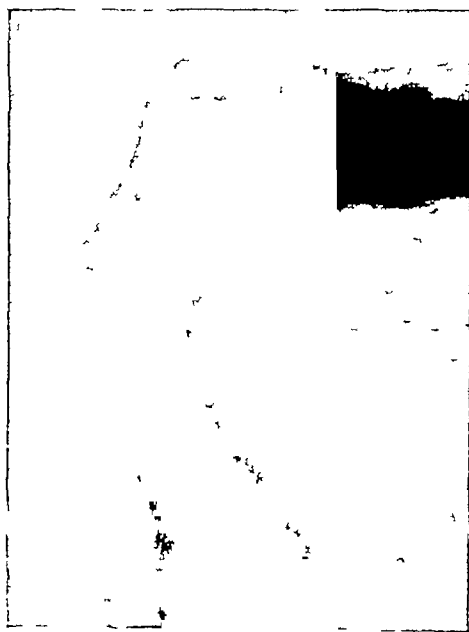


Fig 17 Case I Bent tibia on the right side and T E V on the right side

Of the 3 foetuses between twenty nine and thirty two weeks, the feet were adducted in the case where membranes were intact, in the other case a window was cut in the wall of the uterus to show the position, the right foot was not seen, the left was at right angles

EXAMINATION OF ABNORMAL FOETUSES (75)

In 10 instances of macerated foetus including one of quadruplets, the position of the feet varied, in the case of quadruplets, the position of the feet was at right angles

In 9 anencephalic monsters, the feet were normal in 6 instances Of 8 instances of hydrocephalus, the feet were in normal position in 7 cases

Out of 12 instances with different developmental defects, in 3 the feet were in normal position, there was bilateral equino-varus in 3

The position of the feet was variable in instances of meningocele, thoracophagus, achondroplasia, cyclops, abnormalities of the cord and distended abdomen

Conclusion

1 172 cases of congenital talipes equino-varus have been studied with statistics regarding sex, side affected, the patient's rank in the family, presentation during labour, hereditary factor, other deformities in the family, the presence of other deformities in the patient and consanguinity of parents

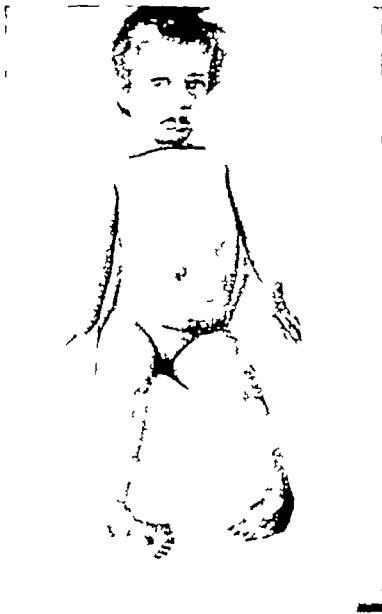


Fig 13 Case E Photo of a female child showing bilateral T E V with stiffness of both knees and contractures of fingers



Fig 14 Case F Photo showing localised thickening of planter aspect of the foot with hypertrophy of the leg and thigh

Comparisons are made with Whitman's statistics Many of the data given are not available for other series of cases one case of talipes is recorded in one of twins

There is a greater preponderance of hereditary element (8%) in this series

2 The presence of other deformities in the patient in this series was 17.5% as against 4% of Whitman. Clinical photos of some of these conditions are added.

3 This high prevalence of other deformities in the patient is in favour of the theory of a primary mesoblastic defect such as a dysplasia of varying degree as the cause of congenital talipes equino-varus, other theories are discussed.

4 Radiological study of the position of the feet in utero was not helpful. The position of the feet in utero in 117 museum specimens have been studied and found to be variable. So far as I can find out, no report of such a study is available.

This study raises the fundamental question of the position of the foot in intra-uterine life, the conclusions drawn from this study negate the theory of "intra-uterine pressure" at least in a large majority of cases.

5 Mechanical or intra-uterine pressure does operate in a very small percentage of cases as in extended breech.

6 Eugenic measures are essential as already discussed by me in a paper on congenital deformities.

I am indebted to Rao Bahadur Dr. A. L. Mudaliar, Professor of Obstetrics and Gynaecology, Medical College and Superintendent of Women & Children's Hospital, Madras, for kind permission to study the museum specimens and Radiograms in his hospital, to the staff of the Barnard Institute of Radiology for the radiological work and photographs and to Dr. G. Parankusam, M.B.B.S., House Surgeon for his assistance in going through the museum specimens.

I am obliged to Lt. Col. G. R. McRobert, I.M.S., the Superintendent, General Hospital, Madras for permission to publish the notes.

APPENDIX

The study of the museum specimens present in the Government Hospital for Women and Children, Madras, shows the following conditions. From this study, it may be inferred that the position of the foot in the foetus is very variable.

KEY TO INDICATE THE POSITION OF THE FOOT

- N. Normal
- Rev Rt. foot Equino-varus
- RD. Rt. foot dorsiflexed.
- R. Rt. foot at right angles
- RI Rt. foot Inverted
- RE Rt. foot everted

F R A Both feet at right angles
 RA R adducted
 L Left

NORMAL FOETUS

Age	No	Position of feet	Other features
8—12 weeks	1	F R A	Small feet in Echricht's position
	1	F R A	
	1	F R. A	
	1	R D L Varus	
8—12 weeks	1	R A L A	Knees straight
	1	R I L F R A.	Echricht's
	1	R I L N,	Twins feet not crossed
	1	F R A	Twins
		F R. A	
	1	F R A	Feet separate semiflexion at thighs and knees.
	1	R D L I.	Cord round neck Constriction on back due to compression by cord in utero, acute lateral flexion of knee
<hr/> 10 <hr/>			
13—16 weeks	1	F R A	Legs not crossed Cord round left knee
	1	R E L I	Crossed feet female
	1		Soles of feet opposed, knees flexed
			Thighs semiflexed and adducted
	1	R I L E	Feet crossed Male
	1	F R A	Missed abortion No membranes
<hr/> 6 <hr/>			
17—20 weeks	1	R I L F R A	Feet crossed
	1	R I L N	Knees flexed Both feet under right buttock, soles facing backwards Right foot bottom most
	1	F R A	Feet uncrossed, membranes intact
	1	F R A	Cord over lower 3rd of right leg and dorsum of left foot
	1	R I F R A	Male, vascular mole, acute flexion of knees, deformity of fingers
<hr/> 5 <hr/>			

Age -	No	Position of feet	Other features
21—24 weeks	1	...	Taylor's position in sitting posture Legs crossed doism of each foot touching opposite knee, toes dorsiflexed Cord around the neck and right axilla
	1	F R A.	Acute flexion of hip and right angle flexion of knee, cold over left thigh and outer border of right foot
	1	R I A, LE	Acute flexion of hip and knee adduction at both hips, feet uncrossed
	1	RD LD	Heel of right foot on doism of left ankle
	1	RDA LD	Membranes intact
	1	REQ LR	Feet under buttocks
	6		
25—28 weeks	1	RED LED	Flexed attitude Cord over plantar aspect of right foot
	1	RD LN	Shrunken foetus
	1	RD LN	Shrivelled foetus
	1	FRA	Triplets Soles of second touching each other
		RI LI	
	1	Male LI RN	Triplets
		Female N	
		Female N	
	5		
29—32 weeks	1	RD LD	Membranes intact
	1	RA LA FRA	Full term uterus with window cut Right foot not seen Left little toe point towards the sole
	2		

ABNORMAL

Macerated Foetus Etc

No	Position of feet	Other features
1	A A	_____
1	N N	_____
1	RD LI	Herniation of abdominal viscera, lumbodorsal tumour.

No	Position of feet	Other features
1	RI	Fœtus undergoing mummification, left foot dorsiflexed at ankle with dorsum touching <i>internal</i> aspect of leg
1	RI LE	Papyraceous fœtus
1		Quadruplets
1	FRA	Acute dorsiflexion of both feet, mummification of placenta and fœtus
<hr/>		
7		
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MONSTERS

Anencephalic

1	N	N	Dolico-cephalic
1	N	N	with Meningocele
1	N	N	
1	RD	LD	one clubhand
			Deformed toes and fingers
1	FRA		
1	.		Trident hand, deep groove on lateral aspect of right ankle and dorsum and medial aspect of left ankle
1	N	N	
1	N	N	
1	N	N	
<hr/>			
9			
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HYDROCEPHALUS

1	FRA		Thighs flexed against abdomen, knees bent.
1	FRA		
1	RD	LD	
1	N	N	
1	N	N	
1	N	N	
1	N	N	extended neck
1	N	N	
<hr/>			
8			
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Ventral Hernia	Exomphalos		Distended Abdomen etc
1	RVarus	LVarus	A cystic swelling too
1	..		All four limb buds rudimentary, soles of feet closely applied to buttocks
			Exomphalos
1	REV	LValgus	Exomphalos Stillborn
1	LVarus		Body laterally flexed, both legs on the right side, right foot pressing on left, ventral hernia
1	N	N	Cyclops
1	N	N	_____
1	EV	EV	_____
1	EV	EV	Double harelip, cleft in right lower eye-lid, flexed attitude, left foot crosses dorsum of right ankle
1	RAI	LN	Abnormally short cord
1	EV	EV	Knees flexed Spina bifida, legs not crossed
	Advanced		No harelip
1			Absent anterior abdominal wall, flexion of the legs at the knees towards the head side by side
1			Short cord, intestines out, deformed lower abdomen, arms flexed with palms against face Left leg flexed, foot dorsiflexed with sole against the face below right ear Right leg flexed at hip Knee straight, Equinus, no harelip.

 12

MENINGOCELE

1	A	A	Hernia cerebri and cystic kidneys
1	EV	EV	_____
1			
1	N	N	_____
1	I	I	Occipital Meningocele

 5

Ventral
Hernia

Exomphalos

Distended Abdomen etc.

THORACOPHAGUS

1	N	N	Dicephalus	Tetrabrachiuste trapes
1	N	N	Both foetus have harelip.	
1	FRA			_____
1	FRA		Genu recurvatum	Absent brain
1	RI	LEV		_____
1	I	I	Tetrabiachus Dipus.	
1	I	I	Feet under the buttocks	
	FRA			_____

 7

ACHONDROPLASIA

1	N	N		_____
1	RD	LVarus	Thickened skin	

 2

CYCLOPS.

1	Feet normal		_____
1	„	With ascites	
1	Feet Valgus		_____

 3

ABNORMALITIES OF THE CORD

1	FRA		Twist and cystic swelling of the cord, Legs crossed
1	N	N	Highly twisted cord, amniotic adhesions.
1	RA		Cord strangling the neck Heel of left foot on the medial side of right foot.

 3

Ventral
Hernia

Exomphalos

Distended Abdomen etc.

DISTENDED ABDOMEN

1	REV	LN	Malformation of the bladder and pelvic girdle.
1		LVarus	Distended abdomen
1	I	I	Do
1	N	I	Distended bladder due to imperforate urethra
1	N	N	Distended abdomen
1	I	I	Full bladder
1	LAI		Teratodyne Common limbs
1			Teratomatous symphysis, both legs fused one toe
1	LI	FRA	Teratophagian is chiropagus Right lower limbs fused but feet separate
1			Teratomatous Ectommatous symphysis, lower limbs fused, seven toes Sole of foot towards abdomen
1	EQ		Teratomatous autosite, symphysis, legs thinner
1	N	N	Terato Cephalon Monster. Achondroplasia

 12

UNCLASSIFIED

1			Amputation of all limbs in utero No deformity of face
1	N	N	Seven months' foetus with ears in the region of the neck just below mandible Feet crossed and below buttocks
1	EV	EV	Distorted hands and legs, short neck, hands clubbed ventrally
1	N	N	Maldevelopment of left ear
1	N	N	Premature foetus with undeveloped kidney
1			Deep fissure in the skin Ears rudimentary eyes not open, face imperfectly formed.
1	FRA		

 7

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HISTORY OF INSTRUMENTOLOGY

BY

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The History of Instrumentology is an interesting chapter in the History of Surgery. It forms a part of the History of human evolution—from the surgical necessities of primitive man of Neolithic age (15,000 B.C.) to the varied and complex needs of the man of present day civilization employing the most modern surgical equipment.

The instruments of Pre-Historic times are seen to have been devised and modified according to the needs of the time.

The birth of Antiseptic Surgery, Bacteriology, Introduction of Anaesthesia and the discovery of Roentgen Rays have still further modified the surgical instruments, era after era

We see clearly how evolution has progressed from the crude and primitive instruments of the pre-historic days of Surgery, from the heavy, large and massive instruments of pre-antiseptic days and from the ornamental ivory and wooden handles of the instruments of Antiseptic Surgery, to the present plain, light and smooth instruments of Aseptic Surgery

The surgical Armamentarium of the present day includes Electro-mechanical instruments—electric knives, electric saws, electric drills, electric sterilizers, etc., all of which are in daily use

The history of Instrumentology may be considered in the following four periods

- 1 Instruments of the pre-historic age
The period extending from the Neolithic and Páleolithic (15,000 B C) Ages to the Iron and Bronze age (5,000 B C)
- 2 Instruments of the pre-antiseptic days of Surgery (Sepsis Era)
The period extending from the Bronze age—(5,000 B C) to the Lister age—(1846 A D)
- 3 Instruments of the Antiseptic period of Surgery (Antiseptic Era)
The period extends from 1846 A D to 1886 A D (Pasteur)
- 4 Instruments of Aseptic days (Aseptic Era) 1886 to the present time

Primitive Instruments

Crushing of the umbilical cord, attending to injuries and removal of foreign bodies, thorns, etc., were the first surgical necessities primitive man had to meet, and his primitive surgical instruments originated and developed—"From earliest flints, thorns, splinters of wood shells, fish bones, teeth and thorns" ¹

Primitive man had crude methods and crude instruments for incision such as "Bits of glass, Bamboo skins, etc" ² These are relics of primitive instrumentology

"Circumcision instruments, even instruments for trephining of the skull are traced as far back as the early stone age—(Neolithic period 15,000 B C)" ¹

"In attempting to trace the origin of the more important instruments in Surgery we are led back to the Paleolithic period, when the stone knife, flaked flint and obsidian were the sole implements used for cutting or scraping as instanced in the evidence of trephining by primitive man from skulls of pre-historic times Trephining is still employed by aboriginal tribes" ³

A feat of primitive surgery is disclosed by the discovery of a pre-historic skull which has been brought to light off the Sussex coast, the skull which dates from the Bronze age—5,000 B C—has undergone two trephining operations, *i.e.*, the drilling of holes in the skull Each hole is more than an inch across The skull is regarded as the only one of the Bronze age found in Britain that shows the operation The specimen of the skull is in the Brighton Museum

The tools used by early craftsmen were drills, saws, wimbles, the cutting knife or scalpel must have also been employed in far earlier times Sources of information respecting the shape and form of instruments used in Surgery in ancient times are the descriptions given in classical Authors' representations in marble and stone

It is not until the Roman period that we have any actual specimens of the instruments employed by the Surgeon

Mesopotamian Surgeons—3,000 B C—(Babylonian, Assyrian, Chaldean and Talmud Surgeons) They had the following instruments — "Knife, Lancet, Trephine, Nail for blood letting"

It is interesting to note that "Surgeons when operating wore leather Aprons" that "before severe operations they gave preliminary sleeping draughts" and that "wounds were treated with warm water or oil, Balsam, Vinegar and Wine" They have performed Circumcisions, Amputations, Trephining, even Caesarian operations" ¹

Chinese Surgery, owing to the lack of anatomical knowledge and the national shyness against drawing blood (Haemophobia), was of a most primitive character Their surgical instruments were fitted more for the cobbler than for a Surgeon's Armamentarium Opening of abscesses and castration were the operations done by them

Their famous Surgeon Hao-Thao (3rd century A D), however, had performed operations, amputations and trephining under general anaesthesia produced by administering narcotics—"Extract of Aconite"

Indian Surgery—1,500 B C—Susruta—disciple of Dhanwantari, the Hindu father of Medicine—has given a special Chapter VII in Susruta Samhita, his book on Surgery, written in 600 B C The Chapter in on surgical appliances, their uses and construction He records 121 Surgical instruments, 100 blunt and 21 sharp instruments but states of them all

the Hand is the most important. Susruta devotes a chapter to the preparations of a Surgeon who has to accompany the King to the battle field. He enjoins that instruments should have good handles and firm joints, should be well polished and sharp enough to divide hair and kept perfectly clean, wrapped in flannel in wooden boxes (Dr Md Osman's Urdu translation of Susruta may be referred to for full details)

Amputations were done by him and boiling oil was applied to the stump

Susruta Samhita Sutrasthana (Ch VII, verse 19) to recognise the defects of bad surgical instruments, says "Too thick, without proper temper, too long, too short, impossible to hold, difficult to hold, bent, loose, too rough, soft-pinned, soft-mouthed or with a loose hold, are the twelve defects of surgical instruments"

Surgical appliances are divided by him in groups and classified as

Incising instruments	(Chidya)
Suturing „	(Sivaya)
Probing „	(Eyhya)
Excising „	(Bhedya)
Scarifying „	(Lakya)
Puncturing „	(Vedhya)
Evacuating „	(Visrananiya)

Forceps are called 'Tongs'. They resemble beaks of birds, beasts, lion or crocodile

Some of these Forceps are illustrated in the "Antiquity of Hindu Medicine" by Chaudry

Some others are illustrated by Hadschi Mohammad Husan Khan Zubairy in Die Cherurgie Der Index

Scalpels, lancets, saws, scissors, needles, hooks, probes, directors, sounds, forceps, bougies, syringes, specula, etc., are in the list of instruments⁴

Besides amputations, Couching operations for cataract, Rhinoplasty and Lithotomy operations are mentioned in detail²

Hypnotism was practised for anaesthesia²

Bleeding was arrested by herbs, cold compresses and hot oil¹

Suturing of intestine was done by allowing living black ants to bite. Severed heads of ants were left in the abdomen (as is done with catgut nowadays) for absorption¹

Fourteen varieties of dressing materials, cotton, wool, silk, linen, splints of bark, bamboo, etc used by him are recorded¹

Greek Surgery—In the Hippocratic writings stress is laid on the importance of the instruments being adapted to the hands of the operator and on the means to acquire “dexterity” and elegant manipulations. We are told that nails should be neither long nor short. We are advised to promote the dexterous use of the fingers.

There is a close resemblance between Susruta’s writings and the Hippocratic collections and some operations described agree with the accounts of Alexandrian and Celsus.

Lister, writing in the 18th century, remarks “A Surgeon’s hands could be of little service to him if he was not supplied with a variety of instruments.” So in the course of time, instruments of every shape, size and form multiplied and every Surgeon knows when an instrument is best adapted to his hand.

Hippocrates in his book, “Corpus Hippocraticum”—300 B C gives the following list of instruments: “Cupping instruments, cauteries, probes, spatulas, needles, lancets, bistouries, raspatories, trephine, canula, catheter, rectal, speculum, dental forceps, wooden instruments, sponges in Hot oil, enema syringe made with animal bladder.”

This will show the richness of the instruments in the Surgery of that period.

Operations practised were “Trephining, Thoracocentesis, Paracentesis, Nephrotomy in Abscess of kidney, Polypi, Haemorrhoids, Fistulae, extraction of Tumour, amputations, removal of Placenta, etc.

Roman Surgery—Galen (130—200 A D) performed experiments and did

‘Ligature of vessels in continuity’ and
‘dissection and division of nerves’

He recommends amputation in gangrene cases. The knife he used is described as a “Small light knife used in operation.” He has called it “Bellied Surgical Knife” so termed by Greek word meaning “Like the breast of a woman.” The Greek word used by Galen is to denote the instrument we now call the Scalpel. And the Latin Authors call it ‘Scalpellus’.

The earliest known representation of the instrument is on a sculptured Tablet of Stone that was found on the site of the Temple of Aesculapius on Acropolis at Athens dated 300 B C.

For illustrations of Scalpels from 300 B C to the 19th century A D—vide Vol XXV—British Journal of Surgery, July 1937.

Scalpels with blades were introduced by Greco-Roman Surgeons in Egypt (150 B C) as evidenced by a Tablet in the Temple of Aesculapius in Komombas in Egypt on the Nile On this interesting Tablet we have many representations of instruments used in Gynaecology by Roman Greek Surgeons of the 2nd century B C It is probable that these instruments were made of Steel as the Greeks had learnt the use of implements of iron

In the time of Hippocrates metal was in common use The Greeks knew the process of tempering steel and made cutting instruments such as blades of knives Galen remarked "Best quality of steel yielded a knife which neither blunted easily nor bent or chipped" It is notable that some instruments like Scalpels were made double ended with the handle in the centre

Hippocrates observed "All instruments ought to be well suited for the purpose in hand as regards their size, weight and delicacy"

Here in the Roman Era, we have fortunately the actual specimens of instruments and the material they used

The Roman Surgical instruments which were discovered are mostly of Bronze, although Iron and Steel were employed for blades, the blades have perished but the Bronze has remained The ordinary Scalpel used by Roman Surgeons usually had a straight sharp pointed blade with sometimes a curved cutting edge

The specimen of knife discovered at Pompeii was made with steel blade and bronze handle, the handle being detachable for cleaning For Roman instruments, it was usual to combine two instruments in one—Probe and Spatula or Scoop This custom of combining two instruments was carried on by instrument makers until modern times The handles of some of the Roman instruments are finely worked and silvered and gilded They exhibit clever craftsmanship, having a figure of a Deity or the head of an animal It is notable that most of the Roman instruments are made of metals, easily cleaned by boiling, blades connected and can be separated at aseptic joints

Julius Cornelius Celsus—25 B C to 50 A.D—in his work on Medicine refers to the use of a Scalpel for 'Dilating a wound to facilitate removal of weapon embedded in flesh' and gives directions to make the incision sufficiently large to extract weapon

It is only in the 1st century A D that we have descriptions of amputation of a limb⁶

Celsus says "When the malady gets the better of our medicine, the limb must be amputated, but this is attended with great danger Patient may die from Haemorrhage or delirium When the stump happened not to

be covered with integument it must be dressed with lint or covered with a sponge dipped in Vinegar

That stumps were fitted with artificial limbs is evidenced from a leg made of Bronze plate, a relic of orthopaedics in the Royal Museum—excavated from an undisturbed tomb near Cupona

Cleodorus 75 A D—About amputations he observes “In sawing the bone the plate of the saw ought to be applied even in order that sawing of bone be even When bones are sawn, cut through the soft parts with scalpel”

Pauleus Aeginata—625-690 A D says “Saw the bone applying saw between rags to prevent tearing and apply red Hot Iron to stop bleeding”

Arabian Surgery—Arabian Surgeons performed amputations and also practised Excision of the bones and joints, Intubation of Larynx, Empyema operation with knife, Treatment of piles by ligature and performed Tracheotomy and Lithotomy¹

Before operation for Embryotomy, it is advised that attempts should be made to procure delivery by means of *Forceps*

The instrument known as ‘Hey’s saw’ was first introduced by Avicena⁷

Razi—850-923 A D advised ‘Ligature of omental vessels with fine thread’¹

He especially constructed instruments for the removal of Foreign bodies from the Oesophagus (The Probang)

He has dealt with the origin, symptoms and treatment of vesical calculi fully in his 23rd book

Razi observes on the *sawing of bone* that the flesh upward and downward should be *stretched with a piece of cloth* so that it may not come in the way of the back of the saw, and that when the bone is diseased the entire diseased portion should be cut out

Abul Faraj—630-685 H in his book “Essence of Surgery”⁸ gives in detail the preparation for and steps of the operation, and the instruments used in the operation

For example —

Excision of cystic tumours—Page 26, Vol II

Excision of glands—Page 29

Excision of breast, etc—Page 29

For removal of a foreign body from the throat, he gives an "ambulatory Probang" method of trying a thread to a piece of meat or sponge and allowing the patient to swallow it and then to pull the thread out, bringing with it the Foreign body

He advised 'Hot old wine' for the cleaning of peritoneal wounds and the use of Vinegar and Honey and Rose Oil for the dressing of the wounds

He has described the *four* methods of Abdominal suturing —The interrupted, The layer by layer, the Through and Through, etc, and has advised the use of *silk thread* for intestinal sutures and the use of the Staffordshire Knot for the control of pedicles

Abul Kasim (Alkasis)—1000 A D at Cordova—Devoted one book for instruments known as "Attasreef" His work is copiously illustrated with figures of the instruments he used It is translated in Latin (1519 and in 1778) and in English by Canning

He has given the treatment of Pannus by removing a broad strip of ocular Conjunctiva

He has laid stress upon *light reflex* in the prognosis of Cataract operations, upon the minute care in the preparation and performance of Cataract operations For cataract, he describes

(1) Depression operation and

(2) The Suction operation, by the insertion of Hollow Metal Needle to extract soft Cataract

The Suction operation is comparable to and is the basis of the modern operation, "Phakoerisis" as devised by Barraquer, in which the suction apparatus used is known as the "Erisophake"

The following is an extract from a page of the Surgery of Albukasis (Translation from Channing's Latin edition)—Book II, Sec 23

"On the cure of Cataract Know moreover that it does not suffice for a disciple to be instructed on the depression of a Cataract, unless after he has seen that operation many times, then he may be-take himself to the work A certain man of Iraq once came to me and said that in Iraq the Needle is made hollow so that by it the Cataract is sucked out In our country I have never seen it on this wise, nor have I seen it described in any book of the ancients Perchance it is a new discovery These then are figures of the kinds of needle, that he who is ignorant may turn to them May Allah most good, most great, be pleased Let them be made specially

of bronze and let their ends be of this same fineness, hard triangular form and sharp at the point ”

Abul Kasim, in his famous illustrated book the “ Manual of Surgery ”¹⁰ devotes —

1st Chapter on “ Indication and contra indications for cautery operations ”

2nd Chapter on “ Arrest of Haemorrhage ” He advises Ligation of Blood Vessels by *Double Thread*, and the lifting of vessel with hook (The aneurism needle)

3rd Chapter deals with details of Lithotrity, Tracheotomy, Gangrene, Amputations and of high amputations as at elbow and knee joint

4th Chapter deals with Fractures and Dislocations

5th Chapter deals with obstetrics with special reference to Prolapse of Hand, Breech, face presentation, etc

Dental Instruments are illustrated in “ Attasreef,” Page 63, *Midwifery Instruments* in Page 164 (12 varieties of Midwifery Forceps and Embryotomes are mentioned), and *Saws* in Pages 149 to 153 The illustrations show the richness in the varieties of Saws used for different purposes by Alkasis

We owe much to this ancient well organised and classified illustrated book “ Attasreef ” on Surgical Instruments Alkasis is the *Father of Instrumentology* It is not until the 10th century in the days of Albucasis (Abul Kasim Ibn Abbas Zahrawi) the Arabian Surgeon that we have fuller descriptions and figures of the instruments employed

There are a number of manuscripts in Arabia and in Persia In Latin it is translated by Guard Cramona—1114 A D The best drawings illustrating instruments in this country are in the Manuscript in Bodhlain Library, dated 1271 A D The drawings are in black ink in realistic style

Another Manuscript is preserved in the British Museum

Among the instruments depicted in the illustrated MSS of Albucasis—936-1019 A D is a knife (amputation) with a straight blade wide at base and narrowing to sharp point which he calls “ a knife razor ” He describes that fleshy parts should be divided with a large scalpel *down to bone* which afterwards is to be sawn across

He introduced special Terminology and classification of the instruments

<i>Incisers</i>	<i>Scalpels</i>	<i>Mibza—14 varieties mentioned in Attasreef</i>	
Cutting Instruments.	Knife	Mishiat	
Cutting "	Scissors	Mikhraz	
Holding "	Forceps	Mibtash.	
Clamping "	Clamp	Mizbath,	Milkat
Retracting "	Retractors	Mibaad	
Probing "	Probes	Misbar	
Sawing "	Saws	Minshar	
Curetting "	Curette	Migraf,	Mijiaf
Exposing "	Speculums	Mikshaf	
Scraping "	Scraper (to scrape)	Micheat,	Mifishat

European Surgery—Handles of Bronze and wood appear to have been introduced in the 4th century

De Chaulie—1292-1368—Famous author of *Chirurgia Magna*, followed the Arabian School. The book for centuries influenced the practice of Surgery in Europe. He classified Haemorrhage as arterial and venous, employed styptics, sutures, cautery and ligatures.

Ambroise Pare—1509-1590. The great French Military Surgeon had much amputation experience on the battle field. He describes two knives, one he calls incision knife and the other crooked knife, crescent shaped.

Andrew Vesalius—1515-1564 has an amputation knife with a large blade rounded off at the point. The wooden handle terminated with a knob curved inward to give a firm grip.

In 1594 Guillemeau figured another type of knife broad and curved at the extremities.

Lisfranc preferred a straight slender bladed knife.

Manuscript of *John Wryghton* 1350 in the library of St John College, Oxford contains 54 drawings of instruments.

In the 16th century blades had become leaf shaped and had double cutting edges secured in a round handle of wood.

In the 17th century examples are found of *All Metal* instruments.

In 1740 Scimitar like blades were used.

Towards the end of the century came handles of Ivory or of chequered wood to give firmer grip and prevent slipping.

Lister in 1846 established the straight blade. The skill and rapidity with which he performed his operations are illustrated in the story of an amputation of the thigh of a man at the University College Hospital, on December 21, 1846. The patient had been placed under Ether for the first time in England. Lister selected one of his favourite long straight knives, turned to the students and others who crowded the Theatre saying "Now gentlemen, time me." The operation was completed "28 seconds" exclaimed Squire who stood watch in hand, "27 seconds" cried Bucknell, "26" said Russel, "25" remarked Palmer, Lister's dresser.

Lister insisted that handles should be smooth and polished and employed a blade one foot long. Lister's amputation knives are in Lister's collection in the Museum of the Royal College of Surgeons.

In the 19th century Surgeons preferred shorter blades. During the last half of the 19th century after Lister, a new era began. For sterilization purposes, instruments were made entirely of metal. Handles of Ivory, bone, wood and Tortoise shell were entirely discarded. They may now be regarded as relics of a bygone age.

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FOREIGN BODIES IN LOIN AND BLADDER IN A FEMALE

BY

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Foreign bodies in the bladder of a female are generally found in hysterical patients or in lunatics. Accidental foreign bodies do occur and bodies are introduced with a purpose in the female for producing criminal abortion and when inserted by quacks without knowing the anatomy, the results are

disastrous Those that are lucky not to end fatally show extraordinary resistance to this horrid procedure One such case (Fig 18), was admitted with a foreign body which was projecting on the left side of the loin well above the iliac crest and to which was attached a string It is difficult to identify the plant from which the stick was taken It was found that the stick could not be pulled out and it hurt her very much X-Ray showed a bulbous shadow in the left iliac fossa and also a faint shadow in the bladder which resembled a foreign body and appeared tubular in struc-



Fig 18 A clinical photograph showing the portion of the stick sticking out with a bit of string attached in the left flank above the iliac crest

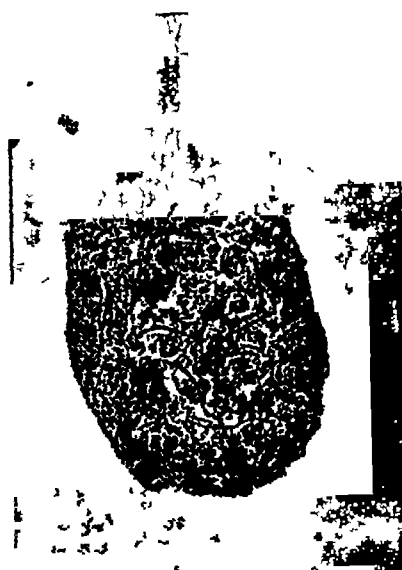


Fig 19 Clinical photograph of the same removed with the stick

ture surrounded by a stone which was of a large size At the time of admission, the patient would not say how this accident had happened, she merely said it was the result of an accident She was found to be very ill-nourished, anaemic, not jaundiced, liver and spleen not enlarged, inguinal glands were found enlarged A discharging sinus 2" above the iliac crest on the back in the scapular line was found through which a piece of wood about 1" in length was found protruding She was operated on and the foreign body with the bulbous end was removed (Fig 19) It was found lying behind the abdominal wall and the shoulder of the bulbous end prevented its being pulled out. The woman had attached a string to prevent its escaping back into the abdominal cavity After the removal of the foreign body she developed a faecal fistula which healed in

about 4 weeks' time Her urine was found to be foul smelling and contained crystals of phosphates On vaginal examination, an enlarged, fixed, hard mass was felt on the left side A vesico vaginal fistula admitting No 3 Hegar's dilator was found situated 1" above the urethra with dribbling of urine On sounding the bladder, a stone was felt A suprapubic lithotomy was done and the stone which was friable was found deposited round a foreign body which resembled in its structure and appearance the foreign body found in the loin (Fig 20) One end of this foreign body was firmly fixed in the region of the fornix and it was removed with difficulty The bladder was drained supra-pubically The stone removed was found to be composed of earthy phosphates (calcium and magnesium)

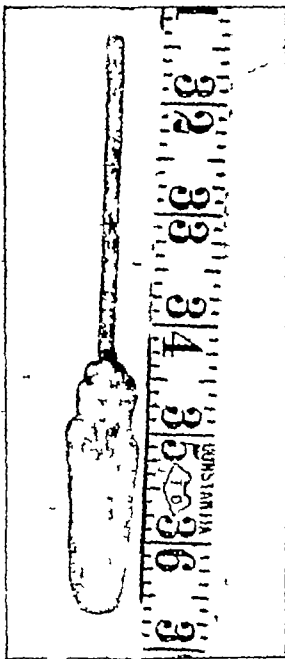


Fig 20 Photograph of the foreign body removed



Fig 21 Radiograph showing dense bulbous shadow over the iliac fossa and a shadow in the region of the urinary bladder

The patient had a stormy recovery During convalescence, after cross-examination of the patient with a promise to keep the whole matter secret, she stated that 3 years before admission a barber midwife had tried to induce abortion with the result stated. She said abortion had occurred but she had suffered great pain and discomfort ever since It is interesting to observe that this barbarous method of inducing abortion by a barber mid-

wife without any knowledge of the anatomical details of the genital region has ended in a vesico-vaginal fistula. The bulbous end of the foreign body attached to a stick must have ulcerated through the fornix and might have produced the abortion which was desired. Later the barber midwife would have thought of removing the foreign body which she had inserted and in her attempts to do so she might have found it difficult due to the ulceration and penetration of the bulbous tip in the deeper tissues and might have broken the stick across into two and as a result of this the distal part of the stick might have penetrated through the vesico-vaginal wall into the bladder and the other end must have moved into the extra-peritoneal tissues later changing its direction as shown in the radiographic pictures (Figs 21 & 22)



Figure 22 Radiograph of the bladder area showing a shadow of a stone in the Centre of which was found a tubular structure

with the rough end of the stick ultimately projecting through the abdominal wall as shown in (Fig 18). Immediately after the operation, a faecal fistula developed which fortunately healed in a short time and this was probably due to ulceration of the bowel wall. The stick in the bladder is the other end of the broken piece which produced cystitis and as a result of cystitis a stone was deposited around it. It is astonishing how this woman could live for 3 years and how the foreign body could migrate in the pelvis without penetrating the peritoneum and without injuring the blood vessels and the nerves and could safely find its way out passing behind the pelvic colon.

Points of Interest

A case of attempted abortion by a barber midwife is reported. A foreign body which was introduced to produce abortion was broken into two, one end of which travelled extra-peritoneally in the tissues behind the pelvic colon after turning a summersault and appeared in the left flank as shown in the picture. Though the patient suffered great pain and discom-

fort, the sharp end of the stick avoided penetration of the peritoneum as well as the blood vessels, nerves and the pelvic colon and managed to ulcerate through the abdominal wall. After the removal of the foreign body she developed a faecal fistula which healed in a short time. The faecal fistula was the result of ulceration and not due to penetration of the foreign body. Around the portion of the stick which penetrated the bladder, a stone developed and the patient made ultimately a good recovery after a stormy post-operative course. If the stick had penetrated the pelvic colon leakage would have occurred causing peritonitis and death. At operation the foreign body was found behind the abdominal wall.

My thanks are due to Dr T Bhaskara Menon, Professor of Pathology for mounting the specimens and Dr V K Narayana Menon, Professor of Bio-Chemistry for the analysis of the stone and to Dr P Kesavaswamy, Radiologist, for the radiographs.

A CASE OF TELANGIECTATIC SARCOMA OF THE RIB

BY

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G, aged 34, male, Hindu, was admitted in the Orthopaedic wards on 24—7—1940 with pain and stiffness of the back and a swelling in the right loin. The complaint originated two months ago as a dull insidiously developing pain in the lower dorsal region, accompanied by a stiffness of the back which rendered any bending movement of the spine extremely difficult and painful. Consequently walking became more and more difficult until eventually he found it impossible to get about without the aid of a stick.

About a week after the appearance of the pain he developed a swelling over the lower part of his chest on the right side which was painless from the very beginning and had been gradually growing in size to reach its present dimensions of a moderately big coconut.

He had no cough or fever previously or subsequent to the appearance of the symptoms. His family history threw no relevant light on his present complaint.

On clinical examination of the spine on the 24th of July, no kyphotic or lateral deviation of the spine could be detected, there was spasticity of the muscles of the sacrospinalis column, particularly well marked in the dorsal region. The lower dorsal and upper lumbar spines were tender on percussion. All movements of the spine were painful and restricted.

Covering the region over the ninth, tenth, eleventh and twelfth ribs on the right side, and sprawling obliquely across the posterior axillary line

was a tense ovoid swelling about six inches long and three and a half inches across, with easily elicited fluctuation, no warmth or tenderness on palpation, no egg-shell crackling and no evidence of infiltration of the skin. The tumour could not be moved over the deeper structures. There was no evidence of cold abscess formation in any of the other usual sites when arising secondary to spinal caries.

The nervous system appeared to be free from pathological involvement except that the knee-jerks were brisk on both sides, and the patient wore a rather apathetic look, taking but an indifferent interest in his surroundings.



Fig 23

A general examination revealed no other constitutional disorder.

In a skiagram the spine appeared to be perfectly normal, on the eleventh rib on the right side there was an irregular area of rarefaction about the size of an anna and involving the entire thickness of the rib.

A tentative diagnosis of tuberculous caries of the lower dorsal spine (where the spinal focus was not detectable by routine radiological methods) with secondary cold abscess formation and caries of the eleventh rib was made, and it was decided to try the effect of a period of immobilisation of the spine.

On the 26th of July he was encased in a plaster jacket extending from the sacrum to the cervical spine with a window cut in the plaster over the site of the cold abscess. On the same day the cold abscess was aspirated under local anaesthesia, with an unexpected result. About 60 c c of dark

red blood were withdrawn. This was sent for culture and pathological examination. The culture was sterile. In a few days the swelling had grown to its original dimensions and was again aspirated on the 2nd of August with the same result. A third aspiration on the 7th of August yielded 60 c c of the same kind of material. The chances of trauma by the needle being the cause of the blood were thus reasonably excluded.

Three weeks of such absolute recumbency with an adequately immobilised spine achieved no appreciable results either in alleviating his pain or in improving his general condition. Accordingly an exploration was decided upon.

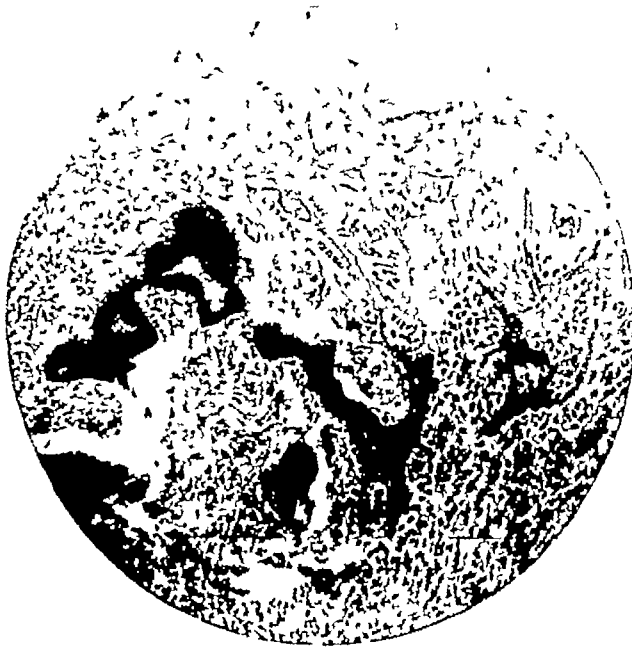


Fig 24

On 16—8—1940 under local infiltration anaesthesia an oblique incision was made over the site of the swelling and a soft friable tumour involving apparently the eleventh and twelfth ribs was encountered. It seemed to have no definite line of limitation from the surrounding soft tissues and exhibited a remarkable degree of vascularity. Dark haemorrhagic areas alternated irregularly with paler patches and in places there were signs of trabeculation—appearances extremely suggestive of an osteoclastoma. The tumour was excised together with adjacent sections of the involved ribs. This stage of the operation was marked by rather profuse bleeding. The cavity left behind was stitched over and drained. The excised tumour was sent for pathological examination.

The patient's general condition deteriorated subsequent to the operation and his strength was sustained by intravenous medication with calcium and glucose. He developed an oscillating type of temperature accompanied by noisy delirium. The wound cavity was periodically irrigated with antiseptic lotion, but the patient showed no improvement in his condition and was getting more cachectic. Except for an occasional short-lived interval of lucidity, he was most of the time semi-delirious and incoherent of speech.

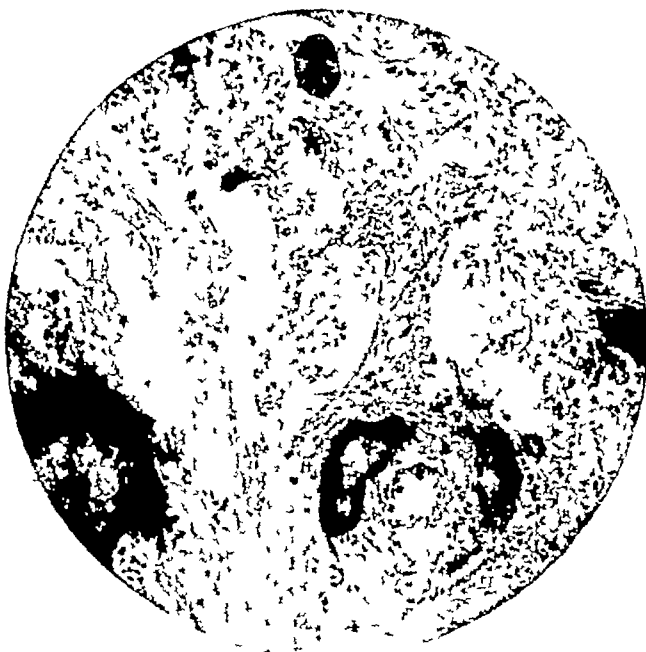


Fig 25

Examination of the lungs at this stage showed diminished air-entry into the right lower lobes and a skiagram revealed a partial collapse of the lower part of the right lung. He developed a bed sore and was taken away by his relatives in a very unsatisfactory state.

*Pathological Report by Dr P Ramachandra Rao, Professor of Pathology,
Medical College, Madras*

Naked eye—The specimen shows pyriform cystic, smooth, swelling of the costal end of a rib measuring about 4" \times 2" and adherent to the adjacent tissues and rib. The sectioned surface shows a large, unilocular cyst with a thin fibrous shell which is bare in some parts and lined by a varying thickness of a greyish parenchyma in others. At the proximal pole of this cyst is a small solid, encapsulated, greyish nodule with a lobulated structure and studded with haemorrhages. Some of the lobules also show a tendency to cystic degeneration (Fig 23).

Microscopically the tumour parenchyma shows the structure of an osteogenic sarcoma of the osteolytic-telangiectatic type

Section shows an alveolated structure with scattered fragments of primary calcified bone in a network of osseoid tissue (Fig 24) In places the alveoli open out into larger cystic spaces lined by columnar or polyhedral epithelial type of cells Sometimes these cells show a heaped up appearance (Fig 25 & 26)

The cavities contain clusters of endotheloid cells and blood The vessels of the capsule of the tumour show endarteritis and perivascular infiltration There are also collections of haemosiderotic pigment mostly inside phagocytic cells

Under the high power, the cells lining the alveolar and cystic spaces show marked pleomorphism, some are spheroidal or columnar and stratified, others resemble the giant endothelial cells of the Hodgkins tissue, and still others are frankly endothelial in type The stroma is partly fibrous and partly osteoid with fragments of primarily calcified bone

The structure is suggestive of an osteogenic osteolytic telangiectatic sarcoma of bone

There are a few interesting points about this case The signs and symptoms with which the patient first presented himself were so very suggestive that a diagnosis of tuberculous caries of the spine seemed to be quite justifiable, particularly in view of the fact that many of the early cases of



Fig 26

Pott's disease of the spine are known to show no pathological signs in the X-ray In the light of the result of the later histological examination of the excised tumour it is possible to correlate the signs and symptoms in the spine with the swelling in the loin, if it is presumed that the former were produced

by metastatic deposits from the latter. But unless one is on the look-out for this variety of tumour, it would take a bold diagnostician to discard the apparently more probable diagnosis of Pott's disease in favour of an angiosarcoma.

The vertebral column in the X-ray showed no signs of a rarefying lesion and in the main tumour mass itself, the X-ray appearances were not unequivocal—an irregular area of rarefaction can appear in so many other common conditions, e.g., tuberculous caries, metastatic carcinoma, multiple myeloma, benign bone cyst, etc. And in this particular case the tumour being in such an unusual situation as the rib, it rendered the remote possibility of diagnosing an osteolytic sarcoma, remoter still. Geschichter and Copeland when dealing with this variety of sarcoma refer mostly to the metaphysical end of the long bones and do not give even a passing thought to the rib. They are of opinion that this form of sarcoma is rarely recognised in the roentgenogram. The diagnostic features in a Radiograph are held to be "an irregular central area of destruction extending through the unexpanded cortex and resulting in a periosteal reaction," and clinically a "bogginess and slight suggestion of semifluctuation."

As regards the gross appearances, on the operation table the tumour with its friability, vascularity and trabeculations presented a very striking resemblance to an osteoclastoma. And such a source of confusion has been admitted in the literature on the subject. Indeed it has been suggested that many of the cases of so-called metastatic giant-cell tumours might have been really telangiectatic sarcomata.

To venture a little more into the realm of possibilities, the curious apathetic state of the patient when he first came under observation and the subsequent upset that he exhibited in his mental equilibrium may be explained as being the result of secondary deposits in the brain—a not unlikely possibility with such a vascular and rapidly spreading tumour as a telangiectatic sarcoma. Curiously enough, no secondary deposits could be detected in the lungs clinically or radiologically. A post-mortem examination would have thrown much light on these points, but it was unfortunately impracticable under the circumstances.

In conclusion it would appear that telangiectatic sarcoma might occasionally prove to be one of the many diagnostic pitfalls in detecting a tuberculous caries of the spine.

Grateful acknowledgements are made to Dr N S Narasimhan, F.R.C.S., for his kind help and guidance in preparing this report, and to the Superintendent, General Hospital for permission to publish it.

A CASE OF PROLAPSE OF THE COLON THROUGH A COLOSTOMY

BY

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The following case is reported as it presented some interesting features —

R, Male, aged 48 years, a bachelor, was admitted on 1st Sept 1939 for protrusion of the Bowel through a colostomy of 19 years' duration

History—In 1918 he was treated in this hospital for prolapse of the Rectum by linear cuaterisation. Later there was a recurrence and an excision of the prolapse was done. There was no history of Dysentery and he denied exposure to Venereal Infection. In 1920 he developed a stricture of the Rectum for which he was readmitted under the same Surgeon. Treatment by dilatation was unsuccessful and a left inguinal colostomy was done



Fig 27

A few months after the operation he noticed a prolapse of the gut through the colostomy. This steadily increased in size until it attained the present dimensions (Fig 27). A cough for the last two years has aggravated the condition. Lately there has also been occasional bleeding from the prolapse

Condition on admission—He is emaciated and has a haggard look, but is healthy otherwise. The prolapsed mass is about 9" long. The mucosa shows a few small polyps and ulceration in places. The prolapse can be reduced easily but causes great discomfort and comes out again at the slightest provocation. Rectal examination reveals a tight stricture about an inch and a half from the anus. There is no evidence of malignancy. The whole of the pelvis could be explored by a finger introduced through the colostomy and nothing abnormal was found. On bimanual examination the stricture was found to be narrow and free from any sign of malignancy.

Since the condition was benign it was decided to make an attempt to restore the original passage after excision of the stricture. A two-stage operation was done.

I stage—Under spinal ethocaine by Dr C P V Menon. Incision as for perineal excision of the rectum after closure of anus. Levatores ani divided on both sides and peritoneum opened, thus freeing the rectum. Circular incision round anus deepened into the space between the sphincter

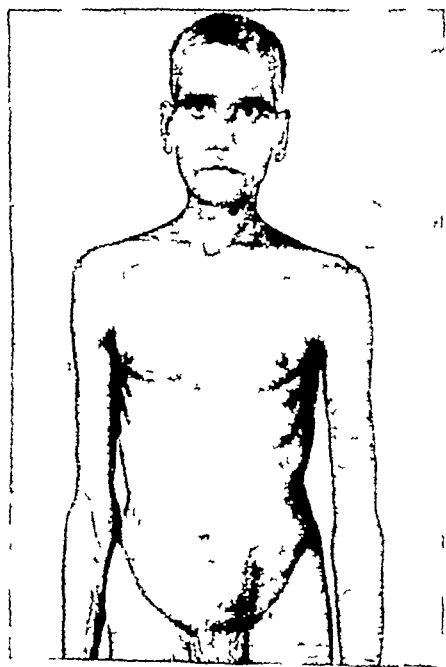


Fig 28



Fig 29

and the mucosa, dissecting a cuff of the latter to a point just above the sphincters. Rectal wall cut through at this level and the previously mobilised rectum pulled down through the anus and divided about 2" above the stricture. The cut end was sutured all round to the anal margin. The peritoneum was closed round the rectum and the pelvic floor repaired over it.

The wound was partly closed and partly left to granulate. The specimen removed showed a dense fibrous impermeable stricture.

In about 4 weeks, the wound was healed and rectal examination showed a free passage with a sphincter which was acting rather feebly.

II stage, a month after the first—Under spinal anaesthesia by Dr C P V Menon Colostomy reduced and opening closed by running silk suture. On exploration through a right paramedian incision the whole of the large intestine was found to be situated on the left side and matted together by adhesions. As it was found difficult to unravel these, the laparotomy wound was closed and an elliptical incision surrounding the colostomy wound was made and through this the abdominal cavity was entered. The prolapsing mass including the whole of the large gut above the colostomy was brought out of the wound and excised. An end to end anastomosis was made between the terminal ileum and the pelvic colon. This was possible because the colon was very much contracted. A flatus tube was introduced up the anus and past the anastomosis and stitched to the anal margin. The wound was closed in layers. The patient made an uneventful recovery and the wounds healed by first intention (Fig 28).

After the operation the patient was having liquid motions resembling small intestinal contents with very little control. There was also some excoriation of the anus (Fig 29). This state of affairs went on for some time and was only slightly improved by treatment. Ultimately the skin condition healed, he still has a diarrhoea but the motions are less frequent and he has a certain amount of control. It is hoped that with the passage of time he will regain control particularly if he can keep his motions solid.

Comment—This case is of interest from the point of view of the long time that passed between the onset of the prolapse and his presenting himself for treatment. The result of the treatment is also of a doubtful nature. For an incontinent inguinal anus with a large prolapse he now has a partly continent perineal anus, an exchange of rather doubtful value. It is a matter of satisfaction, however that the patient himself has no doubts about it and very definitely prefers his present state and after all he is the best judge. He has also improved in his general condition.

I am indebted to my chief, Dr C P V Menon, who treated the case and to the Superintendent, General Hospital, Madras, for permission to report this case. The photographs reproduced were taken by the Barnard Institute of Radiology of this Hospital.

A case of Gastric Ulcer due to a Foreign Body

M H, 35 years, male, a convict referred from the Madras Penitentiary was admitted on 29th December 1939 for pain in the Epigastrium and right Hypochondrium.

History —The patient stated that two months back he swallowed three needles (two ordinary sewing needles and a larger one used for sewing up gunny bags) when he was an under-trial prisoner. For two days following he had no trouble. On the third day he began to notice pricking pain in the epigastrium and the right hypochondrium. The pain was aggravated by food and lasted for hours. Appetite was good. There was no vomiting. He was constipated.

General condition—Good

Local condition—Abdomen moves freely with respiration. No visible peristalsis. Deep tenderness and slight muscular rigidity is elicited over the epigastric, right hypochondriac and right lumbar regions. No masses can be felt. Rectal examination does not reveal any foreign body. No blood found on the examiner's finger.

Sktagram —Of the abdomen showed two long needles over the region of the 2nd lumbar vertebra (see Fig 30)



Fig 30

Operation.—On 11th January 1940, under spinal anaesthesia Dr C P V Menon opened the abdomen by a right paramedian incision. An indurated area $1\frac{1}{2}$ " in diameter was felt in the stomach wall along the greater curvature of the stomach near the pylorus. Continuous with the area was an inflammatory mass involving the omentum and transverse mesocolon. In

the lower part of this mass the points of the needles could be felt. This mass was also in close proximity to the transverse colon and the middle colic artery. The whole of this area was dissected free from the transverse colon and was excised along with the affected area of the stomach. The edges of the defect in the stomach were sutured together in two layers. The rent in the transverse mesocolon was also closed by interrupted sutures. The excised part of the stomach showed on its mucous aspect, an indurated ulcer with the blunt ends of the two needles sticking out.

The patient made an uneventful recovery and was discharged cured on 25—1—40. He reported again one month after as advised and was doing well. It is interesting to note that the needles had both penetrated the stomach at the same spot and had produced there an indurated ulcer and that even though they had perforated the stomach they had not given rise to general peritonitis, but only a localised inflammatory mass. It is also a matter of speculation as to what happened to the third needle. If the history as given by the patient was correct, the needle must have been passed at some time without the patient's knowledge. Similar sharp foreign bodies have been known to traverse the alimentary canal without causing trouble.

To comment on the treatment adopted, it would probably have been sufficient if the needles had simply been pulled out through the mesocolon where they could be felt. The presence of the indurated ulcer in the stomach, however, indicated the more drastic procedure of excision of part of the wall of the stomach.

I am indebted to my chief Dr C P V Menon, who treated the case and to the Superintendent, General Hospital, Madras for permission to publish this case. The skiagram reproduced was taken at the Barnard Institute of Radiology.

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कक्षं समासाद्य यथैव वह्निर्वाय्वीरितः संदहति प्रसह्य ।

तथैव पूयोऽप्यविनिःसृतो हि मांसं सिराः स्नायु च खादतीह ॥ १६ ॥

—सुश्रुतव्याख्यायां सूत्रस्थाने सप्तदशोऽध्यायः ॥

Just as a spark, once having fallen in grass, is fanned rapidly into a fire by a wind, and ultimately destroys all the grassland, so pus, if not let out in time, eats away flesh, blood vessels and tendons

—SUSHRUTA SAMHITA SUTRASTHĀNA
Seventh Chapter, XVI Verse

EDITORIAL

With this issue the Journal enters on the third year of its existence. Our young hopeful has not yet suffered from any of the usual illnesses of infancy, *e g*, disorders of nutrition and has been fortunately spared many a calamity thanks to the fostering care of its first Editor, Dr Moolgavkar and although the venue of publication has been shifted elsewhere as an experimental measure it continues to be under the special tutelage of its original guardians. In a new enterprise like ours there is need always for the guidance and support of all our well-wishers and particularly in a large country like ours where the great distances and difficulties of contact make for the fading of memories, we may be forgiven if we remind our readers that the Journal has the first claim on any report of professional work or other matter of surgical interest in which members of the Association anywhere in the world may be engaged.

In about a week the Association will be meeting at Delhi at our third annual conference when we hope to renew old acquaintances and make many new ones. This session promises to be a remarkable one as in addition to several social engagements and excursions to places of historic interest in and around the capital of India, there is a full programme of discussions on subjects of everyday interest to Surgeons. We hope that there will be a record attendance and that, in spite of the distance and other engagements, members everywhere in India would make an effort and attend the conference in large numbers.

In this issue of the Journal readers will notice the beginnings of a new feature, *viz*, **Visits to Clinics** which we wish to see develop into an ordinary feature of every future issue. We have no doubt that our readers have several similar interesting narratives to relate of visits to other clinics in the world and would gladly welcome not only reports of visits to foreign clinics but also to Indian clinics where Surgical work is now proceeding.

TUMOUR OF THE CAROTID BODY

(a clinico-pathological study with a report of a case of carotid tumour with concomitant tuberculous cervical lymphadenitis)

BY

C R KRISHNASWAMY, M B M S (MADRAS),

AND

P RAMACHANDRA RAO, M B (MADRAS), PH D (LOND)

Though 'Potato tumours' of the carotid body have been described by Jonathan Hutchinson as early as 1888, their incidence is by no means frequent. An excellent survey of the literature with an interesting report of five fresh cases has been given recently by Gordon-Taylor (1940). The clinical setting of these tumours is very varied. They may be entirely silent or accompanied by a varying combination of signs and symptoms, such as dyspnoea, dysphagia, syncopal attacks, hoarseness, cough and chronic constipation. The widely varying range of the manifestations is determined apparently by the variations in the situation of the tumour in relation to the carotid bifurcation and the extent of injury to the underlying vagus, recurrent laryngeal and sympathetic nerves. Opinion regarding its histological identity is also unsettled. Different instances have been designated differently as perithelioma, endothelioma, malignant endothelioma, alveolar tumour and even neurinoma by different sources. Kaufman views them as hamartomata of the carotid node. The question of malignant transformation, local recurrence (8.9%), regional and distant metastasis appears also to need further elucidation by the advent of a larger mass of evidence. The following case is reported principally to let in additional histological evidence on the subject with a view to clarify its nosological situation. The aberrant situation of the tumour, superficial to the bifurcation of the carotid artery and the consequent clinical neutrality and freedom from operative risk in this case are worthy of notice. The concomitant tuberculous lymphadenitis of the cervical glands and extension to the neoplasm is a unique feature of the case.

Case report—V L 45 years, widow was admitted on 20-3-1940 for swelling on the left side of the neck of uncertain duration. Pain in the region of the swelling, head-ache and low intermittent fever were complained of since 1½ months prior to admission. On examination it was noticed that there was a swelling in the left carotid triangle, about the size of an egg, not adherent to the skin or deeper structures. The adjoining lymph nodes were slightly enlarged. The cervical lymph nodes on the right side in both the anterior and posterior triangles were enlarged but discrete. Respiratory, digestive and circulatory systems showed no appreciable abnormality.

On 21-3-1940, under local anaesthesia, one of the glands in the upper part of the neck on the right side was dissected out. Its appearance was that

of a caseating tuberculous lymph node. This was confirmed by the Pathological report from Dr T S Tirumurti. On 25-4-1940 the tumour was removed entire through a high collar incision under light general anaesthesia by one of the writers (C R. K). It was easily separated from the bifurcating carotid vessels lying internal to it, and the spinal accessory nerve running in front of it. The internal jugular vein stretching over the tumour was cut between ligatures. The anterior border of the sternomastoid was also divided. The capsule of the tumour was traversed by a friable plexus of veins which had to be carefully ligatured. The operation was followed by slight facial paralysis, hoarseness of the voice, dysphagia with regurgitation through the nose, slight acceleration of pulse rate, vomiting and acetonuria. On 7-5-1940 examination by the E N T Specialist (Dr Rayan) disclosed paralysis of the left vocal cord, left side of the palate and tongue and paresis of trapezius and sternomastoid muscles. On 16-5-1940 the patient was discharged from the hospital with considerable improvement in the voice and relief of dysphagia. The histological findings of the tumour were compared to those of a mixed salivary tumour by Prof Tirumurti in the first instance. Further pathological examination by one of the writers (P R R) showed to the naked eye a typically encapsulated, solid, oval, 'potato tumour' of the



Fig 1 Sectioned surface mottled red with numerous areas of haemorrhage and cavernous tissue

size of a hen's egg with regular contour, faint grooving of the posterior surface, greyish colour and homogeneous greyish white sectioned surface mottled red with numerous areas of haemorrhage and cavernous tissue (Fig 1). The histology of the tumour was in places not unlike that of a hypernephroma with collections of transparent or faintly staining polyhedral cells having spherical deeply staining nuclei arranged in an acinar or alveolar

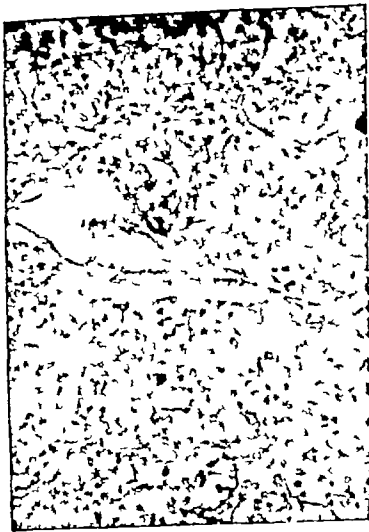


Fig 2 Photomicrograph showing acinar grouping of the pale polyhedral parenchymal cells



Fig 3 Photomicrograph showing the sinusoidal type of capillary network around the acinar groups (Reticular silver impregnation—Foot & Menard's technique)

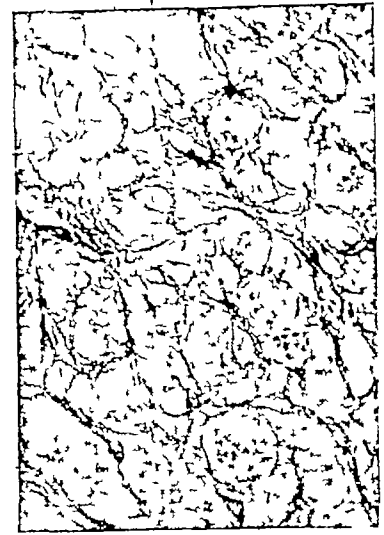


Fig 3a Photomicrograph showing the reticular fibres in the Capillary walls under higher magnification

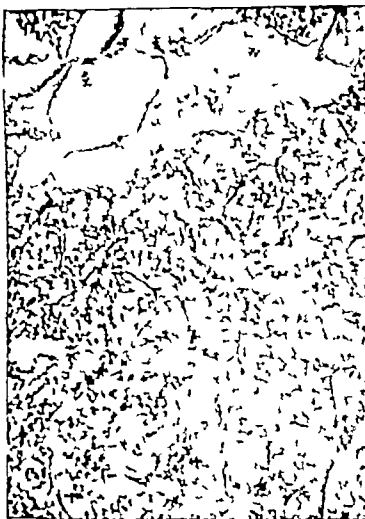


Fig 4 Photomicrograph showing areas with more immature endothelioid type of parenchymal cells (a) and cavernous type of stroma (b)

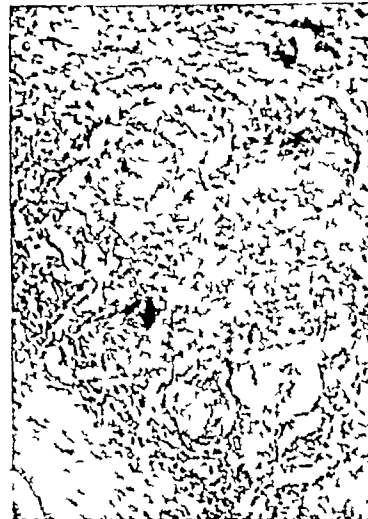


Fig 5 Photomicrograph showing a tuberculous nodule (a) just underneath the capsule (b)

pattern (Fig 2) The scanty vascular stroma was hyaline in places and contained numerous thin walled blood vessels and a net-work of sinusoidal type of capillaries possessing a framework of argentophilic reticular fibres (Fig 3) Other areas presented a more blastomatous sarcomatoid structure with the alveolar spaces packed with clusters of more endothelioid type of

cells with oval deeply staining nuclei and scanty transparent cytoplasm, hardly distinguishable from the endothelial cells lining the sinusoidal capillaries of the scanty interstitial stroma (Fig 4) In still other places the scanty stroma was cavernous in appearance containing only scattered nodules of parenchyma Neither anisotropic fat nor chromaffin material was demonstrable in the parenchymal cells A collection of tubercles forming a small conglomerate nodule was present underneath the capsule in one part of the tumour (Fig 5) The thick fibrous capsule was very vascular and contained numerous nonmedullated nerve fibre bundles

Comment

Ætiology—Tumour of the carotid body usually occurs at the puberal and senile climacteric periods The slightly earlier age incidence (5th decade) in the case reported above may be easily reconciled with this generalisation, if it is remembered that in the tropics these endocrine epochs perhaps set in earlier than in temperate climates This peculiarity of age incidence may be more than merely fortuitous Regressive changes in the carotid body that must apparently accompany the change in the endocrine era might easily be the starting point of the neoplasm (Heinleth) Either sex is affected, though males preponderate

Clinical manifestations—Carotid tumours may occur on either side and rarely on both sides (Rankin) of the neck They are usually situated behind the bifurcation of the carotid artery, projecting on the surface of the neck on both sides of the sternomastoid muscle The tumour was however external and anterior to the carotid bifurcation in the case reported above It may even occur lower down the vessel The tumour grows slowly over years (2—12) to a size about 3—3½" in diameter Occasionally rapid growth may supervene after some time with the onset of malignancy (8.9%, Gordon-Taylor, 1940) Regional lymphatic and distant metastases (hepatic and ovarian), though reported are rare The clinical course is invariably silent The swelling is painless, globular or oval with the long diameter vertical (case reported), slightly mobile from side to side and fixed vertically to the carotid sheath Pulsation communicated from the carotid artery and bruits from cavernous vascularity of the tumour, may be noticed over it The other manifestations such as syncopal attacks—spontaneous or elicited by pressure on the tumour, dyspnoea, cyanosis, hoarseness, cough, dysphagia and pupillary dilatation should be referred to involvement of or injury to the vagus, recurrent laryngeal, and cervical sympathetic nerves which are usually found either adherent to or embedded in the posterior wall of the tumour (Gordon-Taylor, 1940) The syncopal attacks observed during the removal of the tumour in one of Gordon-Taylor's cases, disappeared directly after the section of the vagus nerve which was incorporated in the tumour The immunity enjoyed by the case under report from these manifestations

was obviously due to its aberrant position in relation to the carotid vessels and freedom from involvement of the underlying nerves. However the danger of such involvement from proximity to the tumour was vividly brought home in this case by the postoperative onset of transient left-sided palatal, lingual and laryngeal paralysis with dysphagia, vomiting and acceleration of pulse rate. The local tenderness and constitutional disturbances such as head-ache and pyrexia observed in our case are not usual and were probably attributable to the concomitant tuberculous cervical lymphadenitis.

Pathology

Morphology—The naked eye appearance of the tumour is sufficiently characteristic to prevent its being mistaken for the more common causes of cervical swellings such as tuberculous lymphadenitis, Hodgkin's disease and metastatic carcinoma. The carotid adenoma is usually rounded or oval, definitely encapsulated, firm or soft, solid, vascular and pinkish-grey or slightly brownish in colour. The typical grooving of the anterior surface by the carotid bifurcation may however be absent and even the posterior grooving formed by the ridge separating the lower jaw and parotid region from the tumour be faint, as in the case under report, when the tumour is not situated behind the carotid bifurcation. The tumour may sometimes surround the carotid trunk or one of its branches. The vagus and sympathetic nerves are usually embedded in the posterior wall. The characteristic mottling of the pinkish-grey sectioned surface with numerous haemorrhages and reddish, fine, spongy, cavernous areas is well illustrated in the accompanying plate (Fig 1).

Histology—The alveolar structure formed by a network of capillaries, with compact groups of faintly staining polyhedral cells with deeply staining rounded or oval nuclei filling the meshes, has suggested to many observers the resemblance to a perithelioma. Though haemorrhagic softening of the larger cell groups with formation of cavities filled with blood and appearance of intracellular hyaline globules in the tumour cells have been described, yet angioplastic tissue characteristic of a perithelioma has never been seen in these tumours. On the other hand the presence of chromaffin material in the polyhedral cells is generally conceded. In the case under report the sinusoidal character of the capillary plexus surrounding the alveolar and acinar cell groups was convincingly brought out by the display of a profusion of argentophilic reticular fibrils in their walls by means of silver impregnation technique (Fig 3). Even in areas where the pale immature parenchymal cells have an endothelioid appearance (Fig 4) intercellular fibrils inside the cell clusters were not demonstrable by the above mentioned technique. Thus it would appear that the structure is more suggestive of an endocrine chromaffin adenoma than an endothelioma or perithelioma. The stroma is scanty, very vascular, and is either closely packed with compact

lobules of parenchyma with the structure described above or is loose and cavernous with scattered nodules of immature tumour cell (pheochromoplasts) clusters. Hyaline change in the stroma is common. A sarcomatous appearance of this stroma has also been described. The neurinomatous structure observed by Gordon-Taylor, (1940) in one of his cases has to be accepted with caution as this tumour was not only deeply situated towards the pharynx but was also atypical in its gross anatomy and resistance to irradiation. It was probably, as suggested, a neurinoma of a branch of the vagus or Glossopharyngeal nerves supplying the carotid gland. In this connection it might be relevant to point out that Borst (1936) refers to an interesting combination of neurofibromatosis with chromaffin tumours in general.

Nosology—The older writers have mostly described this tumour as a perithelioma as already pointed out. But as Borst argues, the existence of a perithelium is itself problematic. The so called peritheliomata of piaarachnoid, choroid plexus, brain, serous membranes, bones, kidneys, muscles, skin lymph nodes and ovaries, besides showing spaces filled with blood contain areas of angioplastic growth which are absent in carotid tumours. The latter on the other hand, both in virtue of their situation and structure deserve to be grouped under paragangliomata pheochromocytomata, or tumours of the chromaffin system. In this connection the authors wish to emphasize, that the pronounced vascularity and presence in the tumour of network of sinusoidal capillaries with reticular walls between the parenchymal cell groups, are evidences in support of an endocrine structure permitting intimate relation between the circulating blood and the parenchyma as is observed in metabolic, reticuloendothelial and endocrine organs, such as the liver, spleen, lymphoid tissue, the adrenal and pituitary. The presence or otherwise of chromaffin in the tumour cells will depend on their degree of maturity and differentiation from pheochromoplasts into pheochromocytes. Finally it must be observed that in view of the established inertness of the carotid gland as regards adrenalin production and functional activity, the clinical neutrality of this tumour is not surprising.

Concomitant Pathology—Gordon-Taylor refers to the concomitant presence of carcinomatous glands noted by Roux-Berger and Tailhefer. The complicating bilateral tuberculous cervical lymphadenitis observed in our case was both unique and clinically puzzling. The actual extension of the infection to the neoplasm itself observed also in this case (Fig 3) is a rare finding. Advanced osteomalacia (Oberndorfer) and lemon yellow pigmentation of the skin (Rein) have also been reported in some instances.

Treatment—Some of these tumours are said to be radiosensitive. Most of the cases reported have been dealt with surgically. Ablation of the carotid or its branches would be necessary when the tumour surrounds them. Injury to the vagus and cervical sympathetic is inevitable when the tumour is behind the bifurcation and of fair size. In the case under report

on account of its position superficial to the bifurcation, the removal was comparatively easy and involved only slight trauma to the nerves. Gordon-Taylor (1940) refers to malignant recurrence in 8.9% of the cases. But all his cases were alive 8½ to 13½ years after removal. There has been no recurrence so far (about one year) in our case.

Summary

1 A case of carotid tumour of the left side situated superficial to the bifurcation of the carotid artery in a female of 45 years with concomitant cervical tuberculous lymphadenitis and extension of the infection to the neoplasm is reported.

2 The naked eye and microscopic appearances of the tumour is described and its place in the group of paragangliomata of the chromaffin system is discussed.

3 Attention to the presence in these tumours of the sinusoidal type of capillaries between the chromaffin cell clusters is drawn and the analogy of the structure to that of reticuloendothelial and endocrine organs in this respect is stressed.

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-

THE CARRYING ANGLE OF THE ELBOW IN SOUTH INDIANS

BY

A ANANTHANARAYANA AYER, B A , M B B S ,

AND

V SITARAMA RAO, M B B S

(FROM THE DEPT OF ANATOMY, ANDHRA MEDICAL COLLEGE, VIZAGAPATAM)

Introduction

The carrying angle is the lateral angle of divergence between the upper arm and the forearm when the forearm is fully extended and supinated. The importance of restoration of the normal carrying angle in the treatment of fractures about the elbow is well recognized. The present investigation has been undertaken to give an accurate estimate of the carrying angle in the local population, and an attempt is made to answer the following questions. Is the value of the carrying angle as given in books of Surgery and Anatomy applicable to our people? What is the normal range of the carrying angle in respect of which a result of surgical treatment can be appraised? Is there a difference between the carrying angles of the right and the left sides?

In text books of surgery (Rose and Carless, 1937) the acute angle which the prolongation of the axis of the upperarm subtends with the forearm, is called the carrying angle. But in Anatomy and Anthropology books, the supplement to this angle is referred to as the carrying angle or the elbow angle or lateral divergence angle. This angle consists of two parts with respect to the axis of the hinge movement of the elbow joint, (i) an upper angle pertaining to the humerus, called the cubital angle and (ii) a lower angle pertaining to the ulna, called the joint axis angle.

The existence of the carrying angle enables the pronated hand to be kept in the same line as the upper arm and adds very much to the strength of a thrust or a pull (Thompson, 1924). The carrying angle also obviously enables any object carried by the extended upper extremity to be kept clear of the body especially during walking.

Technique of Measurement of the Carrying Angle

The procedure given in Wilder's Laboratory Manual of Anthropometry (1920) has been followed. On the antero-posterior projection of the outline of the humerus drawn with a dioptograph, the long axis of the humerus and the line joining the lower points of the trochlea and the capitulum are drawn and the lateral acute angle between these two lines gives the cubital angle.

(Fig I-A) A projection of the outline of the ulna is similarly drawn with the ulna held in such a position that it is horizontal and the middle ridge of the semilunar notch appears as a straight line A perpendicular is drawn to

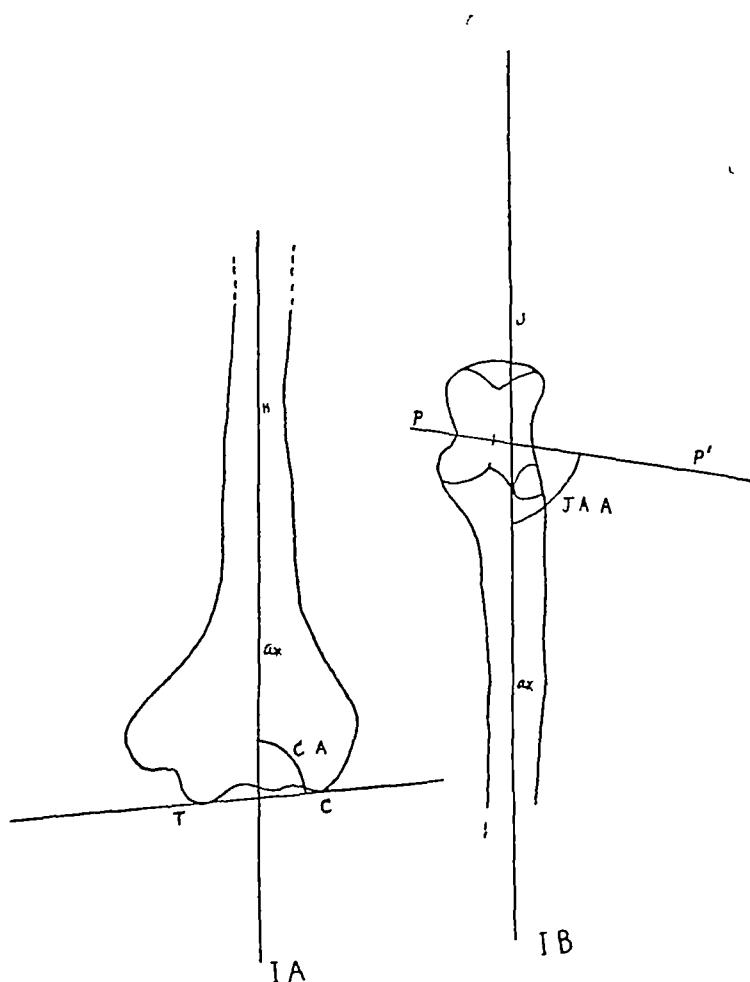


Fig 6 Shows the diophtographic outline of humerus and ulna For economy of reproduction the upper part of the humerus and the lower part of the ulna have been omitted in this figure I-A shows the following H-ax, the axial line of the humerus, TC, line joining Trochlea and Capitulum, CA Cubital angle I-B shows U-ax, the axial line of the ulna, PP', the perpendicular to the vertical ridge of the semilunar notch, and J A A the joint axis angle The carrying angle is the sum of cubital and joint axis angles

the line of this ridge The lateral acute angle between this perpendicular and the line of the axis of the ulna is the joint axis angle (Fig I-B) The carrying angle is the sum of the cubital angle and the joint axis angle

Material and Observations

Twenty sets of humerus and corresponding ulna of adult males have been taken for the purpose of this study Of these 13 were right, and 7 left,

and 5 pairs were each the right and left of the same skeleton. The measurements are given in Table I. An analysis of the observations is given in Table II.

Table I

Serial No	Specimen No and side	Cubital angle in degrees	Joint axis angle in degrees	Carrying angle in degrees
1	A Rt	81.25	84 00	165 25
2	B Rt	85 75	84.25	170.00
3	C Rt	89 00	79 00	168 00
4	D Rt	87 50	81 00	168.50
5	E Rt	84 25	90 00	174 25
6	Rt	87.75	73 50	161 25
7	"	83 00	88 50	171 50
8	"	91 00	75 25	166 25
9	"	82 00	82 25	164 25
10	"	80 25	82 00	162 25
11	"	85 00	82 75	167 75
12	"	86 00	88 00	174.00
13	"	83 50	82 00	165 50
14	A Lt	84 50	89 50	174 00
15	B Lt	83 50	81 25	164 75
16	C Lt	86 00	78 00	164 00
17	D Lt	84.00	74 75	158 75
18	E Lt	84 50	70 50	155.00
19	Lt	85 00	80 50	165.50
20	"	83.50	79 00	162 50

Table II

Particulars of Item	Cubital angle	Joint axis angle	Carrying angle
Average of total 20 items	84 88	81 30	166 16
Average of 13 right items	85 06	82 50	167.60
Average of 7 left items	84 43	79 07	163 50
Average of 5 right items A, B, C, D & E	85 50	83 65	169 20
Average of 5 left items A, B, C, D & E	84.50	78 80	163 30

Discussion

The cubital angle in the South Indian has a mean value of 84 88° and it is greater on the right side (85 06°) than on the left side (84 43°). Its range is from 81° to 91°.

The joint axis angle has a mean value of 81 3° and this is also greater on the right side (82 5°) than on the left (79 07°). The range for this angle is wider, lying between 70 5° and 90.0°.

The carrying angle has a mean value of $166^{\circ} 16'$ and the angle of the right side ($167^{\circ} 6'$) is greater than that of the left side ($163^{\circ} 5'$). The range for the carrying angle is from $155^{\circ} 0'$ to $174^{\circ} 25'$.

It has been mentioned that the angles which the long axis of the humerus and ulna make with the transverse axis of the elbow are equal to one another (Beesley and Johnstone, 1927). But these observations show that the cubital angle is usually greater than the joint axis angle. The mean difference is $3^{\circ} 5'$.

From the above observations it is seen that as a rule the right side has a larger angle than the left. There is only one exception to this in this series, which might probably be that from a left-hander. Previous workers have not alluded to this fact that the carrying angle is usually larger on the right side. The higher value for the right side is probably correlated with the more frequent use of the right hand for lifting heavy objects.

It is generally admitted that the carrying angle is smaller in females and it is accounted for by the greater width of the pelvis and the shortness of the upper limb. It will be also interesting to know if the carrying angle remains fixed during different periods of life or is modified in any way with age. But these questions are not discussed here, as bones of females and children were not included in this series.

The carrying angle has been mentioned by Anthropologists as having some racial significance, being smaller in whites and larger in Native Australians. The average values for the carrying angle given by different books are, 167° in females and 173° in males (Gray's Anatomy, 1939), about 165° (Rose and Carless' Surgery, 1937) and 160° to 170° (Trandler's Anatomy, 1926). These values apply to the European races. The value of the carrying angle of the South Indian, 166° , also falls within the ranges given above.

Conclusion

The mean value of the carrying angle of the elbow in the South Indian is 166° . The range for the angle in adults lies between 155° and $174^{\circ} 25'$. The majority of cases lie between 160° and 170° . The value of the angle of the right side is larger than that of the left side by about 4° .

We wish to express our thanks to Mr R K Rau, F R C S E, Professor of Anatomy, for permission to do this work in the Department of Anatomy, Andhra Medical College, Vizagapatam.

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THE TECHNIQUE OF OPERATION FOR ELEPHANTIASIS SCROTII

BY

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PRINCIPAL AND LECTURER IN CLINICAL SURGERY,

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The procedure described in most Text Books and articles is complicated, requiring assistance of a reasonably skilled type, employing multiple incisions and being with all, a lengthy procedure which cannot be said to have been designed according to any principle or to follow the indications of the anatomy of the part

The common conditions under which the Surgeon is asked to work in the Tropics are such as to preclude the possibility of invariably good assistance, the climate renders lengthy operations exhausting to the Surgeon, and, more important, to the patient, sepsis is a more present danger than in cooler climates and the possibility of it occurring is greater with the length of operation, particularly in these cases. In fact Post-Operative Sepsis is the great danger in these cases. I have therefore constructed for myself, a technique, which is applicable in nearly all cases no matter what the deformity, which follows the anatomical indications evident, which may be carried out single-handed or with very mediocre assistance, and is less time consuming. I make no further excuse for this article than to say that as far as I know the method is original—at least I had to work it out for myself, I have never seen it described or mentioned in any article. In my hands it has been eminently successful. Others may, per chance, be interested.

The Operation depends upon the utilization of the relatively avascular median raphe for the incision, and the direct ligature of the blood supply of the scrotal flaps preliminary to their excision. The other points are the methodical display of all the gross structures by blunt dissection along tissue planes before any attempt is made to deal with the Hydroceles, etc, which may be present.

The technique is thus a planned attack along certain definite anatomical indications of the part.

The usual very careful pre-operative preparation is, of course, necessary. These patients are going to lose large quantities of body fluid by sweating and by removal of the huge oedematous mass of tissue constituting the tumour, therefore adequate fluid replacement must be ensured before, during, and after the operation. The steps of the operation, as I practice it, are as follows —

(1) The patient is placed on the table in 15 degrees Trendelenberg position. If the tumour is very large, the legs are supported on either side in slings, otherwise they are left on the table.

(2) The tumour, the perineum, the lower half of the abdominal wall and the thighs down to the knees, are prepared with alcohol and picric acid

(3) Towels are placed in position so that the tumour presents freely from the pubis to the perineum

(4) A breast knife or large scalpel is taken and an incision made in the mid-line from the pubis down to the penile dimple in the tumour mass, or, if the penis is affected and presenting as an elephantoid mass, then along the dorsum of the penis. The incision is continued from the penile dimple (or along the ventral surface of the penis) exactly in the line of the median raphe up to the limit of diseased tissue in the perineum. The incision is rapidly deepened in such manner as to follow the line of adhesion between the halves of the scrotum until the tumour is cleft in two halves

(5) *Large abdominal towels wrung out of hot saline* are wrapped one over each half of the tumour

(6) If the penis is buried in the tumour mass it is now dissected out by picking up the body deep between the two halves of the scrotum and following it up to the glands with the fingers. This is an easy dissection through oedematous tissue which bleeds very little. If the penis is affected and presenting, then the two flaps formed by the incision already described, are easily dissected back. A further abdominal pack wrung out of hot saline is wrapped round the penis and laid in the mid line over the pubis

(7) One half of the scrotum is selected and by blunt dissection with the fingers, the testicle, with its hydrocele intact, is freed and the cord followed up and extracted from the mass of that half of the tumour. The organ is wrapped in an abdominal towel. The opposite testicle is treated in similar manner

(8) The flaps thus left are now inspected and a decision is made as to where the demarkation between healthy and diseased tissue occurs. Having made this decision, the Superficial and Deep Pudendal Arteries with their veins are sought out in the upper and anterior portion of the flap. These vessels are much enlarged and easily found, lying in the oedematous tissue above and below the External Spermatic Fascia. The fascial layers are very easily traced in these cases. The arteries are clamped and tied at a level appropriate to the decided level of the incision which will prepare the new scrotal flaps, *i e*, the level of distinction between healthy and diseased tissue. In the posterior perineal portion of the scrotum the Posterior Scrotal Arteries are located in a similar manner and tied appropriately. The vessels of the opposite half of the tumour are treated likewise

(9) The two halves of the enlarged scrotum are now ready to be excised easily and without loss of much blood. This having been done, the next step —

(10) is to treat the hydroceles by one of the many techniques appropriate to the size of the one being dealt with

(11) The two testicles are now placed, one behind the other and the scrotal flaps brought together by well, but not too closely placed, vertical mattress sutures of silk worm gut. The incision is closed comfortably around the base of the penis and above up to the Pubis. It may be necessary to excise a fair portion of the oedematous fatty tissue often found covering the pubis in these cases, the skin of this part, however, is not often affected

(12) Thiersch grafts are cut in strips of convenient length from one or both of the thighs and laid in position on the shaft of the Penis. A dressing of mercurochrome solution, 2½% seems to be particularly comfortable and safe for the grafts, it should be allowed to dry before the gauze is placed in position

There is a certain amount of oozing of serosanguinous fluid from the scrotum which escapes easily provided the scrotal sutures have not been placed too closely, or tied too tightly

The points of advantage in the technique are that the time-taking placing of artery forceps and tying the many bleeding points which present in the course of the operation by other techniques is avoided by the more logical procedure of keeping to the relatively avascular median raphe. The small amount of bleeding which occurs along this line is easily staunched by the hot towels. Each testicle and the penis, is rapidly located in turn and easily dissected out. The arteries are well defined and easily found in their anatomical positions and can be clamped and tied at any suitable level thus avoiding any blood loss during the excision of the huge scrotal mass. Instead of a long, tiresome, uninteresting and usually gory and untidy operation, this procedure is simple, straight forward, and falls into well defined natural operative steps, and, it will be seen that very little assistance is required. I have, in fact, many times carried through the operation with no assistance at all. I have found that the time required to complete the operation is at most less than half that necessitated by any of the other well known techniques

I have carried out the operation in my last sixty cases consecutively without regard to the deformity present or the size of the tumour. There has been only one case of sepsis and that cleared after 48 hours energetic treatment along the usual lines. On most occasions I have been assisted by only one assistant, and in over half the operations this assistant was a student. In seventeen cases I have operated alone without any difficulty. The longest time taken to remove a scrotum in this series was seventy five minutes and the shortest thirty minutes. The average case takes about 45 minutes. Shock is consequently rarely present

TWO CASES OF SOLID TERATOMATA OF THE OVARY IN CHILDREN.

BY

P GOVINDA RAU, M B B S , F R C S (EDIN)

Ovarian Tumours are rare in children and specially so are solid teratomata of the Ovary The following two cases occurred in children of 9 and 10 respectively

Case I—N aged 9 Admitted on 18-10-40 on the medical side of the Govt General Hospital, Madras, for a swelling in the abdomen of one year's duration

History—The patient noticed a swelling in the right iliac region one year ago The swelling has been growing steadily since

Condition on admission—Weight 62 lbs Pulse 98 Patient slightly anaemic and emaciated Cervical glands palpable

Local condition—Abdomen distended, superficial veins of the abdominal wall prominent No shifting dullness A hard tumour mass, dull to percussion is felt occupying the right iliac, hypogastric, left iliac, left lumbar and left hypochondriac regions The swelling appears bilobed The lower pole of the tumour is palpable at the brim of the pelvis and the fingers can be easily insinuated below and behind the mass

Investigations—Blood R B C 4 39 million per c mm

W B C 116000 per c mm

Haemoglobin—83%

Differential count	—Polymorphs	66 5%
	Lymphocytes	18 2%
	Esinophiles	14%
	Basophiles	1%
	Mononuclears	0 51%

Wasserman reaction—Negative

Blood Urea—70 5 mgm %

Urea Clearance—36 3% of the normal
(average normal)

X-Ray findings—A plain film showed radio opaque substances in the tumour and a picture after a Barium enema showed that the tumour had displaced the colon posteriorly

The case was transferred to the surgical side to the Wards of Dr C P V Menon and she was operated on on 3-12-40 under general anaesthesia

A large, solid tumour extending almost to the Diaphragm was found arising from the right ovary with rather a long pedicle. Except for the omentum spread out over its upper portion there were no adhesions. The



Fig 7 Case I Photograph of the Specimen—Scale below shows inches and centimetres

pedicle was divided between clamps and the tumour was delivered outside and removed after a little extension of the original incision. The pouch of Douglas showed a few gritty peritoneal deposits. Uterus was small and atrophic.

Pathological appearances of tumour—Microscopic—A large encapsulated, lobulated tumour, cystic in parts and solid in others weighing 14 lbs and measuring 12" and 11"—(Fig 7). The capsular surface shows large multiloculated cysts with mucoid contents in one half of the tumour. The cysts have thin fibrous walls with a few scattered islands of low papillary growth projecting into the lumen. Small tufts of fine hair are also seen either lying free in the contents or adherent to the cyst wall. The solid half shows a lobulated structure, the lobules are fatty, fibroid, adenomatous or mucoid in appearance. The intervening fibrous septa are thin and vascular. Calcified bony areas are felt in parts of the tumour during section.

Microscopically—Sections show derivatives of all the three embryonic layers—(Fig 8). Tubular and cystic areas lined with all columnar stratified ciliated epithelium, with cartilaginous nodules in the neighbourhood, suggesting origin from Respiratory Anlages, mucous secreting glandular tissue and scattered bundles of smooth muscle fibres. Stratified squamous epithelium, adipose tissue containing tubular glandular structure resembling coiled glands of skin, scattered epithelial pearls surrounded sometimes by lymphoid tissue, hair follicles, sebaceous glands and collections of ganglionic cells undergoing shrinkage and calcification.

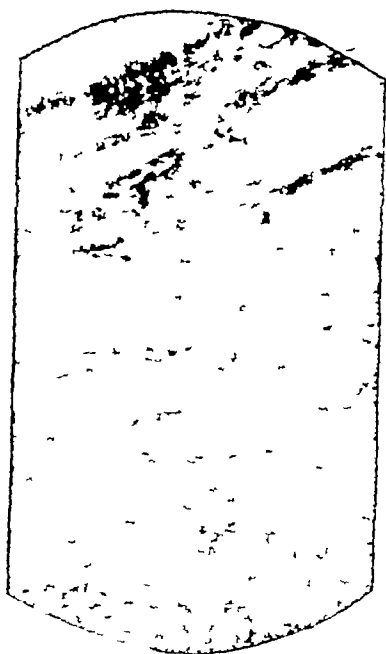


Fig 8 Case I Photomicrograph
Showing ciliated columnar
epithelium, an alveolar structure
and nodules of cartilage



Fig 9 Photograph of the Sectioned surface
of the tumour in case II

Case II—P Aged 10 Admitted on 13-12-40 under Dr C P V Menon for a tense and painful swelling in the lower abdomen

The only history that could be elicited was that the patient had pain and swelling for the past eight days

Local condition—A rounded tumour about the size of a cricket ball was seen and felt in the right iliac and umbilical regions. It was painful and tender to touch. Examination under anaesthesia revealed that the mass was freely movable and could be easily pushed into the pelvis. The tumour had a cystic feel.

The case was operated on by Dr C P V Menon under general anaesthesia. A solid tumour of the right ovary twisted clockwise twice round its pedicle was found. The pedicle was clamped and cut and the tumour removed. The left ovary and the uterus were normal.

Pathological appearances of the tumour—Microscopic—A globular encapsulated, lobulated tumour, cystic in parts and solid in others with prominent congested vessels and scattered areas of haemorrhage on its capsular surface. Sectioned surface shows a multiloculated cystic structure with mucinous and haemorrhagic contents. A small area of spongy consistency is seen in one part of the tumour (Fig 9).

Microscopic—Here also sections show tissues belonging to all the three layers of the embryo which, however, are less differentiated than in the previous case. Loose fibrocellular embryonal stroma, numerous areas resembling Notochordal tissue, large cystic angiomatous spaces containing homogeneous material resembling lymph and nodules of cartilage. Areas of branching solid tubular glands and tubular structures lined by tall columnar epithelium with cartilage in the neighbourhood. In some parts the structure of the tumour is more solid and embryonal in nature. In these areas haemorrhage into the loose mucocellular stroma is observed (Fig 10 and 11)



Fig 10 Case II Photomicrograph showing tubular spaces lined by columnar epithelium alveolar tissue & nodules of cartilage



Fig 11 Photomicrograph showing a large angiomatous space embryonal type of stroma and a nodule of cartilage

Comment—Solid teratomata of the ovary are common tumours and occur chiefly in children and young women. The youngest age recorded is 3½ years and the oldest 40. They are said to fill the abdomen. In case I, the tumour had filled up most of the abdomen and weighed 14 lbs. The largest weight recorded is that in a case of Lassen where the tumour weighed 10 kgm (22 lbs).

They are said to be invariably malignant. Case I has been under observation three months now after operation and has been putting on weight although she did show some gritty deposits in the pelvis. Observation for a few months more is necessary before a good prognosis can be assured. Case II was discharged in a good condition and asked to report in six month's time. In view of the fact that the average period of life of these

cases is one year, it is hoped that we will be able to keep these cases under observation

My thanks are due to Dr C P V Menon, Surgeon, General Hospital, Madras who operated on both the cases and to the Superintendent, General Hospital, Madras, for permission to publish these case reports

Case I was referred to us by Dr K N Murthy, M D , Hon. Physician

A CASE OF SOLITARY, NON-SPECIFIC, CHRONIC ULCER OF SIGMOID COLON, RESEMBLING PEPTIC ULCER

BY

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History—N, a Hindu, male, aged 43 years was admitted to the Madras General Hospital on 27-7-1940 for a painful mass in the left iliac region. The history dated from 1938, when he noticed a small lump of the size of a marble in the left iliac region. He had been having a dull acting pain in the same region which had no relation to food. He had gradually increasing constipation, relieved only with saline purgatives, with the gradual increase in the size of the lump. The stools were free from blood and mucus.

Examination—The patient was well nourished and in good health. A hard, firm, globular lump of the size of an orange, tender on deep palpation was noticed in the left iliac region 2 inches medial to and below the left anterior superior iliac spine. It was fairly freely movable and was not attached to the anterior abdominal wall. No other abnormality was noticeable in the abdomen. Rectal examination revealed nothing abnormal. Skiagrams taken after a barium enema showed the presence of incomplete obstruction to the passage of the barium enema in the sigmoid colon. Examination of his stools furnished no pathological finding except well-marked acidity to litmus paper.

Operation—Under percaïne spinal anaesthesia, an exploratory operation was done on 2-8-1940 by Dr B M Sundaravadanan through a left paramedian incision. At the junction of the proximal and middle thirds of the sigmoid colon there was a hard, cicatrising mass. The lymphatic glands in the mesosigmoid were not enlarged. The mass was resected and an end-to-end anastomosis of the gut was performed. Nothing abnormal was found in other abdominal viscera.

Post-operative convalescence—The post-operative convalescence was uneventful except for a transient diarrhoea for about a week after operation.

Pathology—The resected portion of the sigmoid colon showed a tubular cicatricial induration with considerable narrowing of the lumen which hardly permitted the passage of the tip of the little finger. The mucous surface shows an excavated chronic ulcer, about $\frac{3}{4}$ " in diameter, with slightly overhanging and puckered margins, situated mostly over the mesenteric border of the gut (Fig 12). The neighbouring mucous membrane appears corrugated and hypertrophic. The sectioned surface of the ulcer shows a dense cicatricial base, covered over by a thin greyish layer of slough and exudate.

Microscopically, section of the ulcer shows, besides slight undermining of the margins, the typical histology of a peptic ulcer (Fig 13). The muscular

coat is completely breached underneath the base of the ulcer. The adjoining mucous membrane shows branching tubular glands resembling those seen in the pyloric mucosa (Fig 14)



Fig 12 Photograph of the ulcer-bearing segment of the sigmoid colon. The ulcer is seen transversely sectioned through to show the cicatricial base—(a)

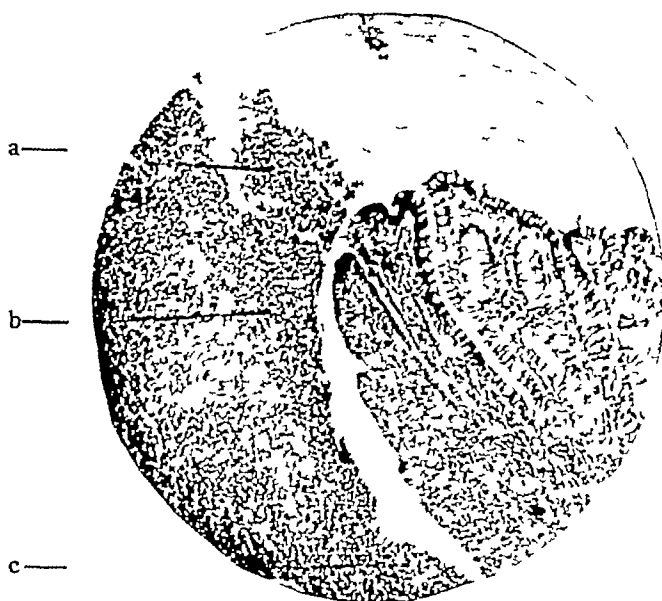


Fig 13 Photomicrograph of the margin of the ulcer showing the undermining of the edge of the ulcer, the layer of leucocytic exudate on the surface—(a), granulation tissue below—(b) and cicatricial connective tissue further down extending for some distance under the margin—(c)

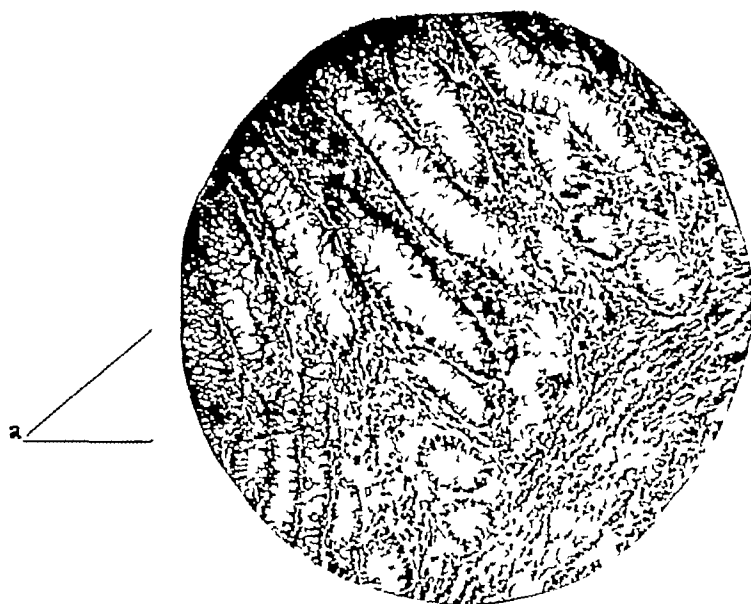


Fig. 14 Photomicrograph of the hypertrophic mucous membrane in the neighbourhood of the ulcer showing the branching tubular glands—(a)

Comment—Instances of non-specific solitary chronic ulceration of the colon are rare. Heterotopic peptic ulceration has been reported not infrequently in Meckel's diverticula. A. L. Taylor (1921) has investigated 130 cases of Epithelial Heterotopias of the Alimentary Tract and failed to find a single instance of congenital heterotopia in the large intestine. He concludes "Congenital heterotopias appear to be confined almost without exception to that portion of the gut which lies above the level of the ileocaecal valve". Since, however, the peptic ulcer-bearing area of the stomach and duodenum is derived from the foregut, there is no reason why displaced heterotopic rests derived from the foregut should not occur in the anlagen of the hind-gut, if they can occur so low as the Meckel's diverticulum derived from the mid-gut.

In the case reported, the histological analogy to peptic ulceration is fairly convincing. In the absence of evidence of ulceration of either dysenteric, tuberculous or any other origin in the rest of the gut, the presumption of peptic type of ulceration from a heterotopic rest becomes more probable. The situation of the ulcer in the mesenteric border of the gut eliminates the possibility of its origin from an inflamed diverticulum ('pseudomalignant tumours of the colon'). Besides, in this case the mucous surface of the indurated gut was ulcerated. In view of the uncertain role played by hyperacidity of the gastric chyme in the genesis of all peptic ulcers, the observation of persistently acid reaction in the stools, in this case, is not over-emphasized.

I am indebted to Dr B. M. Sundaravadanan and Dr P. Ramachandra Rao, the Pathologist for their help and guidance in preparing this report. My thanks are due to the Superintendent, General Hospital, Madras, for permission to report this case and to Dr P. Rangachari for the microphotographs.

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CYST OF JACOBSON'S ORGAN

BY

D SUBRAMANIAM, M B, M S,

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G, Male, aged 16 years was admitted on 17-10-1940 into the General Hospital, Madras, under the care of Major F M Collins, I M S for a swelling of the Upper Jaw of 4 months' duration

History—Four months ago he noticed a small slightly painful swelling over the gum of the left upper lateral incisor. Pain subsided in a few days but the swelling began to increase in size, disfiguring his face and pushing his left nostril towards the right side. On examination there was a cystic swelling of the size of a lime occupying the alveolar and pre-maxillary portions of the left maxilla. The swelling was soft and tense on its anterior aspect, where it was covered only by the mucus membrane and was of a bluish tinge. Upwards it had extended into the left nasal cavity displacing the septum to the right and downwards it had pushed down the anterior part of the hard palate. The swelling was painless. The teeth in the affected region were displaced in a characteristic way. The roots of the teeth were pushed away from each other, while the crowns showed a tendency to cross each other. No tooth was missing. A skiagram of the upper jaw revealed the outline of the swelling and showed a cystic cavity with a bony wall all around.

On 23-10-1940, under general anaesthesia an operation was performed by Major F M Collins, I M S. The cyst was opened through the gum. It contained about an ounce of thin clear fluid. The cyst wall was partially dissected away and partially destroyed by scraping and cauterisation with pure carbolic acid. The bones were moulded into position and the cavity closed by packing. The fluid from the cyst was sterile on culture and contained about 62 mgms per cent of Cholesterol.

The cyst wall was examined by the Pathologist and reported on as follows. The wall consists of fibrous tissue lined by stratified epithelium the outer layer of which is columnar ciliated.

Comment—The anterior part of the palate and the floor of the nose is a region of many vestigial remnants. Of these the Vomero-nasal organ (Jacobson's organ) develops in the nasal septum close to the naso-palatine canal. Its vestiges may lead to cyst formation at the junction of the maxilla and the floor of the nose. A cyst of the pre-maxillary region is described in which the embryonal nature of the epithelium suggests its probable origin. Cysts might arise in connection with other vestiges, as the incisive canal and the cysts in this region cannot be ascribed always to dental conditions.

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Visits to Clinics

UNITED STATES OF AMERICA

BY

LT-COL K G PANDALAI, FRCS, IMS (RETD)

The writer has no excuse for the publication of these notes made a few years ago—except that holidays abroad which are rare these days afford a unique opportunity for study and I have had some very interesting experiences which I wish to share with those of my brethren who may not have had similar opportunities. It is, of course, possible that what I thought was interesting and worth record at the time, might not appear so now but the reader is the best Judge and I may be forgiven for the personal touch unavoidable in such narratives.

Towards the end of March 1938 my wife and I sailed from Madras in a ship which was neither very large nor fast, but we preferred it as there are advantages in setting sail from one's own native town and we desired a long and quiet voyage with good food. All these were available on the 'Bernardin de St Pierre' which carried French Mails and belonged to the Messageries Maritimes Co. We gathered later, that this boat was originally owned by the Germans and was allotted to the French as a prize after the Great War. She travelled slowly and covered not more than 300 miles a day. She touched practically every port on the way, especially French possessions. The voyage was not exciting, the weather was trying and we could not avoid a feeling of boredom only occasionally relieved by the pranks of a large group of children the ship carried.

Our first surprise occurred after leaving Djibouti when somewhere about the middle of the Red Sea, a bitterly cold wind sprang up and blew continuously from west to east and we realised that it could be cold in the Red Sea. This unusual weather was not too pleasing to skins that had been tuned to a tropical sun and as we went further north the weather became so cold that our accustomed deck life was completely abolished, every one retired to the warmth of the cabins or the drawing rooms with every door and ventilator shut airtight. At long last the voyage came to an end and we arrived at Marseilles in the 2nd week of April.

The writer had for long cherished a desire to visit the United States of America. This had been reported to be a land of scientific progress and where Indian travellers generally had a good time. I had, however, been warned that every Indian going there should wear a puggree or Turban as otherwise one might be mistaken for a Negro with all the resulting inconveniences of social segregation which was stated to be in vogue in certain

parts of the country I provided myself with one such headgear although it never had been popular with me. Fortunately I totally escaped being a victim of mistaken nationality during my sojourn in that country. From British teachers and literature alike, we, in India, had assimilated certain British prejudices and unthinkingly assumed such to be just and rational. As a result of such prejudices, I had known instances of Indian seats of learning, declining offers of co-operation for interchange of Professors with American centres of thought. The present war has changed our outlook considerably but in 1938 people in India were shy of things American and ignorance ruled regarding the true values of American scientific progress. The writer made up his mind to see things for himself and after a few days in London, left Southampton for America in the famous French Trans-Atlantic Liner, the 'Normandie' which held and, I believe, still holds the record for the fastest crossing of the Atlantic. Life on this ship was entirely different from that on the smaller steamers that ply in the tropical seas. The cabins are large and warmed by electricity, the passage was comparatively short and in the 'Normandie' which covered more than 700 miles a day, the entire crossing of the Atlantic took not more than $4\frac{1}{2}$ days. This was much too short a time for people to feel bored. On the other hand, we felt interested every minute and were constantly making plans of what we were going to do at our destination. The arrangements on the boat for upper class passengers were so comfortable that when the time came for us to alight at New York all felt that the voyage was over too soon.

I will not weary the reader with the numerous small details of disembarkation. These details are trying enough when you think of the time they take, the passport examination, medical examination, etc. At New York medical men of the Port specially look at one's conjunctiva for the presence of Trachoma as the United States of America, I suppose, do not want more of this disease than they have. We passed all tests satisfactorily and going ashore were met by waiting hosts whose kindness immediately dispelled the feeling of loneliness and despair which comes over one on going to a large and strange city for the first time. As we saw more of the American people, we realized how interested every one was in the things that we represented. They were willing and ready to give information and welcomed us wherever we went. They readily entered into conversation and on discovering that we hailed from India, were extraordinarily courteous. We now spent a short time in seeing the sights of New York and making friends. This could have gone on for many weeks, so many were the friends and endless the things to be seen, but I soon began to long for the sights and smells of the operating theatre.

Since the primary aim of my holiday was to see the work going on in America in my speciality, Surgery, naturally, my first longing on arrival in New York was to get near the famous men whose names I had cherished for years and who have made American Surgery what it is to-day. I had been

fortunate in getting an introduction before leaving India from an American worker in Madras to the Medical Director of the Great Rockefeller Foundation of New York. Here on the 69th floor of an enormous and gorgeous looking building I met Dr R A Lambert to whom I made a request for introductions to the leading Surgeons of the country. I learnt later that the *Rockefeller Foundation* does much for visitors from all parts of the world who come to the United States for study. On my return to the Hotel a few hours later in the day, I received quite a bundle of introductions to several eminent Surgeons in different parts of the country and was told that copies of these introductions had been mailed to the Doctors concerned direct from the Foundation office.

Armed with these introductions, I began my programme of visits to the Surgical Clinics of the United States of America in the course of which we covered, New York, Ann Arbor, Chicago, Mayo Clinic, Boston, Philadelphia and Baltimore. In this note I propose to speak of the Mayo Clinic, which although not the first institution which I visited is, however, of such outstanding interest and world-wide reputation that I feel I must give it the pride of place in a description of the Medical Institutions of North America.

The Mayo Clinic

The Mayo Clinic was founded by two brothers, William and Charles Mayo in the town of their birth at Rochester, Minnesota State. This is not a large city and had only about 23,000 inhabitants in 1938. It has few other large buildings besides the Clinic and attached Hospitals. It is about 8 hours by rail from Chicago by the North-Western Railway and is essentially a Hospital town, which owes its importance to the Mayo Clinic, the people you meet in the streets have all something to do with the Clinic, as patients or their relatives and they assume that every new arrival has some physical complaint. This produces a general feeling of sympathy and good will, much as is felt by patients in a Hospital ward. While out for a walk, our complexion and dress attracted much attention and many were the enquiries about our ailments. People stopped us on the road sometimes for our autographs, sometimes to tell us eloquently about their troubles. I had never seen such camaraderie and fellow feeling elsewhere.

There are a few good Hotels and a great many boarding houses in the town. It is clean and quiet as there are no factory chimneys to foul the air, and the life of the town, moving slowly round the Clinic, runs its even tenor much as it has run for many years past. The Clinic is a beautiful building, 19 storeys high, originally built in 1912, enlarged and rebuilt in 1927 and is a solidly built and lavishly furnished structure. The floors and dado are of mosaic or coloured marble imported from all parts of the globe. Its situation well away from the busy centres of trade gives the town a certain air of aloofness and dignified scientific activity.

To us in India the first impression when told about the Mayo Clinic is that it is a large Hospital This is not so The Mayo Clinic briefly is a large Out-Patient Department or Consulting Room with attached Laboratories Here patients from all parts of the world are examined, (interpreters in German, Italian and French are employed to assist patients of those nationalities to explain their symptoms to the examining Doctors), various investigations made and advice given but treatment is given in the Hospitals attached to the Clinic, situated not far from it These Hospitals are separate organizations under independent control Poor patients are treated free, the well-to-do pay reasonable charges and the earnings from the Clinic and the occasional private work of the staff of the Clinic are all credited to the Clinic The staff receive fixed salaries sufficient to live in comfort and have no distractions to divert their minds from the pursuit of their respective branches of study

To a visitor the greatest civility is shown The Clinic employs a large attendant staff who, dressed in their Grey blue civilian uniforms, unostentatious but distinctive enough to show that they belong to the Clinic, are the pink of courtesy and have a cultured friendly manner so different to the ways of similar personnel in the East

The Americans believe in their Doctors and carry out advice They have been taught by the Profession to take notice of slight changes from the normal in their bodily state and members of the public come to the Clinic from all parts of the country for what they call an Annual "Check up" They come long distances and we met some who hailed from far away San Francisco and Florida We were told that they often did these trips by private Automobile in preference to travel by train Air travel was already highly developed and had practically everywhere become an established rival of road or train travel Rochester too had its Airport with facilities for night landing Mail planes called here daily People came to the Clinic from all parts of the world and we met quite a number of people from the South American States, European visitors arrive in great numbers Shortly before our arrival an Indian Raja from the Bombay Presidency had gone there and remained several weeks The number of his retinue was still the talk of the town when we arrived

One is struck with the great volume of work done in the several departments every day on some days while we were at Rochester, the daily attendance rose above 800 Of this number about $\frac{2}{3}$ were new arrivals who had to be registered and distributed according to the nature of the case This work on such a large scale involves an accurate system of Registration and inter-communication within the Clinic Telephone and electrical signalling are employed extensively Almost every worker has a telephone within easy reach and every room its own instrument Traffic from floor to floor is by swift moving Lifts or Elevators of which there are several, so that

delays are avoided. The chute is employed for sending 'chits' to the Record Office but perhaps the finest contrivance is in connection with the delivery of patients' case and other papers from the main Office below to the various floors as may be required, promptly and without the aid of the human element. This is a system of an endless chain to which are fixed carriers or wire trays in which the required article is deposited and could be cleared as the chain in endless motion passes through every floor of the Clinic.

The various floors of the Clinic are allotted to the various departments and laboratories attached. In order to understand how a patient is handled, I myself underwent an "overhauling" after a formal registration. I was given a thick brown envelope with a number and was asked to see a certain Doctor on a certain floor. On my reporting to a girl clerk at the counter of the specified floor, I was asked to wait in a large and beautifully arranged waiting room where scores of other patients were also waiting. Later I was taken to a room where I was presently seen and interrogated regarding my symptoms by a Physician who was an Assistant to the senior Physician who was to see me later. The latter came in after some time and on going through the notes prepared by his Assistant gave me a number of coloured envelopes each representing a separate department of the Clinic such as X-Ray, Blood test, Antigen tests and so on. I was to go to the various departments concerned on different floors and make appointments directly with them. This was an easy matter as the Lift took one up or down to the various departments in a very short time. Investigations of various systems by these departments followed, this occupied two or three days after which another appointment with the original Physician was obtained. Finally an opinion and prescription followed. The remarkable thing about all these is the simplicity and good humour and the absolute absence of any hitch anywhere during the tour of the various sections of the Clinic.

As a Surgeon I was particularly interested in the Surgical work of the Clinic. Operations are done from 8 o'clock in the morning onwards. Very few Surgeons operate in the afternoon. A printed list of operations by the various Surgeons of the Clinic is circulated in advance and a visitor to the Clinic can get a copy on request at the Hotel where he lives or at the Clinic offices.

St Mary's Hospital, reached in a few minutes by bus, is the largest Hospital attached to the Clinic. It has about 600 beds. Operations by Clinic Surgeons are also performed at the Kahler and Colonial Hospitals next door to the Clinic. Taking all the specialties and the various Operation Theatres in which work is going on simultaneously the total number of operations done daily easily reaches an average of 100.

The permanent staff of the Clinic comprises 150 Doctors including all specialties. In addition there are about 150 post-graduates (Fellows of the

Mayo Foundation) who study and assist in the Clinic, thus making 300 Doctors working in a single Institution

I was particularly struck with the efficiency of the Anaesthesia Besides spinal anaesthesia gaseous anaesthesia of all kinds is employed Intra tracheal and intravenous methods are in frequent use Ethylene and Cyclopropane were in use under suitable indications Local anaesthesia wherever possible is employed. The advance made by American Surgeons particularly in the field of Brain Surgery is phenomenal The skull is opened and cerebral tumours, benign and malignant, extirpated with the greatest ease, thanks to the almost routine use of Blood transfusions To a visiting Surgeon at Rochester the day is much too short for seeing all he wants to see, weeks pass so rapidly that when the time comes for him to leave he is intensely sorry

Particularly fortunate was the writer in having been able to meet the late William and Charles Mayos in the course of his visit William Mayo, the elder of the two brothers, aged 74, grey haired, was still working and went his rounds in the forenoon to see patients in consultation with the younger members of the staff The younger Mayo, Charles, was unfortunately a sickly man as he had recently suffered from a stroke, but he also worked and attended the Clinic office regularly During the short time we spent at Rochester, I met him more than once and felt impressed with his most human and attractive personality

To the Mayo brothers I spoke about our Indian Surgeons and they sent through me a message to our young Association of Surgeons. This message of good will to India, I had the good fortune to deliver personally at our inaugural meeting in Bombay in October 1938 and feel grateful for having had the privilege of meeting two of the greatest Masters of Surgery, for shortly after my visit both the brothers died within a short period of each other

Even Rochester has a daily Newspaper called the "Post Bulletin" and in its issue of Monday, June 20, 1938, this paper published a long column of news from a Lucknow correspondent with bold headlines to the effect that a Cholera epidemic prevailed at Lucknow and that the dead bodies were thrown into the rivers and wells according to Hindu custom which forbids their being buried or cremated This news had been cabled to the American Press by an unknown source in India and the Editor of the local daily took the opportunity of our presence to verify the information by an interview which was reported verbatim I need not say that many people readily believed the newspaper report and but for the presence in flesh and blood of some of us from India in Rochester at that time, people would have readily concluded that we in India are hopeless savages whose barbarities the Government is vainly trying to reform.

Many of the common people were surprised when we spoke English. Much ignorance prevails about India and if we wish to dispel the prejudices still prevailing extensively about our people in parts of the world outside the British Empire, our countrymen should travel more often than we do and go wider out of the limits of the Empire.

Chicago

Turning now to the more populous centres of learning, we visited next a typically large American city, Chicago. It is the second largest city in the U.S.A. and has produced many eminent practitioners of the Surgeon's Art. It has extensive facilities for medical study and is well supplied with large Hospitals and Medical Colleges. Its population is $4\frac{1}{2}$ millions, nearly as much as Bombay, Madras, Calcutta and Lahore put together so that the clinical material available is very large. It is not generally known that Chicago has 3 Universities and as many as 100 Hospitals of all sizes. These institutions are of long standing and the staff of some of them includes some of the most eminent men of the Profession. I was able to visit only a few of the larger institutions such as the Billings Memorial Hospital, Illinois Research Hospital and the Cook County Hospital. For size I do not think the East has anything to show beside the *Cook County Hospital*, which, as its name implies, is a Hospital maintained by the County of Chicago which would correspond to a large Taluk Board in this Presidency. Its size may be judged by the fact that it has 3,300 beds, comprising Medical, Surgical, Eye, Maternity, Psychiatric, T.B. and Infectious Diseases Sections. It is a teaching Hospital and employs 800 Nurses and in addition a male staff of 200 men for jobs requiring male assistance. They are not sectarian in outlook, as one of the male staff was a Japanese. One member of the Surgical teaching staff is an Indian from Bengal who has settled in Chicago and has a lucrative private practice. At the time we were visiting, the Hospital was overcrowded and was in need of additional accommodation. We were told that this Hospital is always overcrowded. The wards are large and accommodate 32 patients each. All patients are treated alike, Negroes and Whites being in the ward side by side. This Hospital, I was informed, was one of several of its type scattered over the United States, maintained by local bodies out of public funds. We were told that all such Hospitals are normally in a congested state and badly require additional accommodation.

I next visited a smaller (400 beds) but no less famous institution, the Billings Merritt Memorial Hospital, which owes its importance to the reputation of the staff working in it. Such well-known Surgeons as Phemister, Bailey and Adams were here and I had the good fortune to watch Phemister operate. It was a case of Oesophageal Cancer in which at a previous sitting another Surgeon had performed gastrostomy. Phemister entered the thorax after resecting the sixth rib, through an incision extending from the spine to

the cartilages in front and after incising the mediastinal pleura freed the oesophagus which he divided below and turned in the distal end. Then closing the thorax after providing for drainage, he opened the neck behind the sterno-mastoid and brought the oesophagus up and fixed it to the skin. Later the stump of the oesophagus in the neck was connected to the gastrostomy by a glass tube. The patient was a man aged 60 and his own family Doctor was sitting beside me in the gallery. I learnt from the Doctor 6 months later that the man was alive and well.

This is a private Hospital depending on endowments for its upkeep and like all such institutions in America maintains a high standard of excellence in its scientific work.

The next institution we visited was the Illinois Research Hospital which is also a privately endowed institution. It has 250 beds and specialises in the treatment of children and although adults also are received it has many interesting features of social and educational facilities, especially for children.

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सूचिभिरिव निस्तुद्यते, दृश्यत इव पिपीलिकाभिः, ताभिश्च संसर्प्यत इव, छिद्यत इव शस्त्रेण, भिद्यत इव शक्तिभिः, ताड्यत इव दण्डेन, पीड्यत इव पाणिना, घट्यत इव चाङ्गुल्या, दह्यते पच्यत इव चाग्नि क्षाराभ्याम्, ओषचोषपरीदाहाश्च भवन्ति, वृश्चिकविद्ध इव च स्थानासनशयनेषु न शान्तिमुपैति, आध्मातबस्तिरिवाततश्च शोफो भवति, त्वग्वैवर्ण्यं शोफाभिवृद्धिर्ज्वरदाहपिपासा भक्तासुचिश्च पच्यमान लिङ्गम् ; ॥ ५ ॥

सुश्रुत व्याख्याया सूत्रस्थाने सप्तदशोऽध्यायः ॥

The following are the symptoms and signs when pus is forming —

Pricking as by needles, biting as by ants or a sensation as if ants are crawling over the region, a cutting sensation as if by an instrument or by a sword, piercing sensation as by spears, or as if the part were beaten with a stick or squeezed by the hand or rubbed by the fingers, a burning sensation as if the part were burnt by fire or by a caustic, The burning sensation may be felt in the surrounding area and may be accompanied by a sensation as if the part were being sucked Like a person stung by a scorpion the patient is not comfortable in any position, sitting or lying There is a tense shiny swelling like a blown up bladder There is change in the color of the skin With increase in the swelling there is fever, a sensation of heat all over the body, thirst and loss of appetite

—SUSHRUTA SAMHITA SUTRASTHĀNA

Seventeenth Chapter, V Verse

EDITORIAL

At the last annual Conference of the Association of Surgeons of India held at Delhi in April 1941 one of the subjects for discussion was 'Injuries of the Elbow Joint'. This question was discussed in all its aspects and there was unanimity of opinion that these injuries are common in all parts of India, especially among children, that the lower end of the humerus is fractured in most cases and that the treatment generally adopted for such cases leaves much to be desired. A large percentage of these injuries is left unreduced, or put up for healing in the old and dangerous position of acute flexion at the elbow joint resulting in permanent crippling of the limb due to ankylosis in extension or from Volkmann's contracture. It was agreed that these injuries require immediate and careful reduction followed by vigilant supervision in the post-reduction period.

The general opinion of the Conference on this important question was that far greater stress than at present should be laid in the teaching of students in the final year as well as in post-graduate clinics, to look upon these injuries as serious ones requiring immediate and watchful treatment for obtaining a happy result.

An X-Ray should be taken immediately and if deformity is present it should be reduced without delay under anaesthesia. The limb should thereafter be put up in a right angle position in supination. A light plaster of Paris casing should be applied and the forearm supported in a sling. When oedema has subsided, another plaster support fitting the outline of the limb should be put on. This plaster should be worn until bony union has occurred. This may take 6 weeks or more, following which, the arm should be carried in a sling and the patient encouraged to make active movements. Massage and passive movements should be avoided. Patience on the part of the Surgeon and patient are necessary for a happy ending. If such a regime is carried out good results may be expected in most cases and there will be fewer crippled and functionless elbows than are seen at present.

We would appeal, therefore, to every Teacher of Surgery and every Specialist practising Surgery of the bones and joints in this country to make it a point to preach the importance of the prompt treatment of injured elbows on the lines suggested above.

K G PANDALAI

EMPHYEMA THORACIS

BY

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AND

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Mr President and Fellow Surgeons,

In initiating a discussion on the above subject, I feel a certain amount of diffidence for various reasons. In the first place, the subject had to be written up in a comparatively short time and therefore, complete classification of all the case results was not possible. Secondly the disease not being a particularly common one like appendicitis or hernia, the number of cases dealt with is not very large, and consequently, opportunities for original observation and research are few. When one remembers, that till about 1918—1920, before the world was faced with the catastrophe of the great influenza epidemic, during and after the last great war, the treatment of Empyema was more or less the same in essential details for over a century, one can easily understand why progress in the treatment of the disease was slow. This non-progress was obviously due to comparative lack of sufficient number of cases for careful and accurate observation and checking up of results, and contrasts very strikingly, with the rapid strides made in other branches of surgery during the same period. In the present paper, I have not brought out any new principle or any new line of treatment. But, I have endeavoured to elucidate and emphasize, the anatomical, physiological, pathological and therapeutic principles, so clearly demonstrated during the above mentioned influenza epidemic by the Empyema Commission of the United States Army appointed during 1918—1919 to investigate the causes of high mortality after drainage operations for the disease, and to reduce the appalling figures if possible. This commission went about its work with typical American thoroughness and made certain recommendations. Ever since I read this report, I have followed these recommendations in the treatment of the disease and I have never yet regretted doing so. Although well known to and followed by most surgeons, it is my belief that restatement of and re-emphasis on these recommendations will not be altogether wasted.

I am going to include in this discussion Acute Empyemata and only a few types of chronic ones. Empyemas starting insidiously and which are chronic from the beginning, such as tuberculous and actinomycotic lesions will not be touched at all, as to do so will unnecessarily enlarge the scope of the paper and probably divert our attention from the essential principles on which I wish to lay particular stress.

I shall first deal comparatively briefly with some Anatomical and Physiological considerations. This is essential for the proper understanding of the therapeutic principles.

Anatomy—Detailed description is not necessary as all anatomical text-books supply us with ordinary facts. The important points from our point of view are the following —

A The thorax is more or less a rigid cavity containing three serous spaces, the right and left pleural spaces containing the lungs and the pericardial cavity containing the heart. Between the right and left pleural cavities, there is a resilient and comparatively non-rigid partition called the mediastinum.

B It was the belief of some anatomists and surgeons especially Duval that in some animals particularly dogs, the pleural cavities communicate with each other through an opening in the mediastinum. Graham and Bell have, however, conclusively proved that this communication does not exist. The importance of this will be brought out in the physiological considerations.

Physiological Considerations—In the words of Graham, the well-known American surgeon, who says that "In a sense all surgery is based on Physiology and the newer school of younger surgeons who are pausing in their training to obtain a greater experience in that basic science is an indication of the recognition of this fact." This saying is never more true than in surgery of the chest which contains very important and vital organs, and tragedy and catastrophe lie in wait for anyone who ventures inside the chest wall without familiarity with the laws of nature, governing the organs in the chest.

The first and foremost point to remember about the chest, is, that there is negative pressure inside it, because of two opposing forces which tend to keep lungs in contact with the chest wall and pull them away from it, respectively. The pleural cavities are only potential spaces containing normally only a little lubricant serous fluid. This negative pressure varies on an average from -4 to -9 mm of mercury according to the individual and according to whether the chest is in the inspiratory or expiratory position. The extremes recorded are between -2 and -18 mm of mercury. This negative intrapleural pressure is essential to life as respiration will be impossible otherwise and this negative pressure also helps in drawing and sucking blood in the auricles and also promotes lymph flow in the thoracic duct.

Pleural effusions are due to engorgement of lymphatics and the tissue spaces of the visceral pleura during inspiration and their emptying in the pleural cavity during expiration. The more oedematous the lung, the quicker the accumulation as for example in streptococcal infections. This fact was first brought out by Graham in experiments on dead lungs. But

more strikingly by Brock and Blau of St Louis, who used the "Staring" type of living heart-lung preparations for their experiments. These experiments also showed that the quieter the breathing the less the collection and vice versa. If the lungs are not oedematous, the same is true of absorption. Quicker breathing means quicker absorption.

It is not necessary to deal at length with gaseous exchanges in the lungs, but it will help if we understand a few terms used in the process of pulmonary ventilation.

1 *Residual air*—Air remaining in the lungs after forced expiration. About 1500 ccs in an average adult.

2 *Tidal air*—Air inhaled during ordinary inspiration or exhaled during ordinary expiration. About 500 ccs—600 ccs in an average adult.

3 *Complemental air*—Air inhaled in forced inspiration. About 1500 ccs to 2000 ccs in an average adult.

4 *Supplemental air*—Air exhaled in forced expiration. About 1500 ccs in an average adult.

The total quantity of air comprising tidal, complemental and supplemental air indicates the vital capacity of a person which in an average adult consists of 3500 ccs to 4500 ccs. Extremes noted are 2500 ccs to 7500 ccs.

Proper conception of Theoretical significance of vital capacity is essential for the understanding of thoracic disease and surgery.

Vital capacity is diminished in the sitting and prone positions, in obstruction of air passages, in case of weak respiratory muscles, in reduction of lung volume available to alveolar air as in collapse of lung or disease, diminished activity of respiratory centre as in anaesthesia, in severe infections and acidosis and in many other conditions.

Significance of change of intrapleural pressure in operations on Thorax—Open Pneumothorax is the chief handicap in development of chest surgery. Pleural incisions, although large are harmless on occasions but sometimes even small incisions cause death. The older idea was that the mediastinum was rigid and that only the lung on the side of open Pneumothorax collapsed. This idea dies hard and even to-day it is not sufficiently well realized that big and bold incisions in the pleura even on one side may be fatal because of fluttering of the mediastinum, unless the effects of open Pneumothorax are counteracted by the use of a Sauerbruch negative pressure chamber or in more recent times by a positive pressure intratracheal anaesthesia.

In 1918, Graham and Bell, members of the Empyema Commission, first brought to light the following facts —

1 The older conception that the mediastinum is rigid and that, in an open Pneumothorax, only one lung is affected and the size of the opening in the pleura is immaterial, is entirely wrong

2 Both lungs are affected in one sided open Pneumothorax and even with small openings, both are affected equally A lung is not necessarily functionless because of open unilateral Pneumothorax as then Bilateral Pneumothorax will be invariably fatal If Bilateral openings are not too large, life is still possible and lungs can function This is true in dogs and rabbits as well and Cruveilhier had shown this to be true in dogs as long ago as 1836

3 Unilateral opening if sufficiently large is fatal

4 The really important fact is the amount of air entering the chest and whether the patient can compensate for the encroachment on the respiratory surface This becomes a question of the relationship between the size of opening in the Pleura and the patient's vital capacity If for any reason, as for example in streptococcal Pneumonia, vital capacity is only equal to tidal air, then even a small opening will kill A patient with vital capacity of 7000 c c s with normal and healthy lungs, can stand an opening or openings in the pleural cavities of about 100 Sq cms in size

5 The results of openings in pleural cavities will be modified by intrapleural adhesions and inflammatory induration of the mediastinum

6 Closed pneumothorax is much less serious than an open one Unlike open pneumothorax, impossibility of getting the requisite amount of tidal air into the lungs does not occur A large enough closed pneumothorax, however, will kill a patient by asphyxia

Inflammations of the pleurae—In the beginning all empyemas start as pleural inflammations The shiny serous appearance of the membrane is lost, oedema and congestion are present, fibrin is deposited on the surface and at first its adhesive character causes a pleural rub and pain on breathing Later on effusion takes place, or in some cases adhesions form, obliterating the pleural cavity completely or in parts, giving rise to multiple sacculi Therefore in the first stages, there is only dry pleurisy, and if it remains in this stage, it is not of much surgical importance In the second stage, effusion takes place and this may be general or sacculated It is almost always serous, sero-sanguineous or faintly opalescent at this stage, but becomes frank pus after some time Purely serous effusions are more often tuberculous But in pneumococcal or streptococcal infections, this effusion becomes purulent or sanguino-purulent later on A purely sanguineous effusion without trauma or infection is practically always due to malignant disease

When frank pus is found in the pleural cavities, the disease becomes empyema This is one of the most important lesions in thoracic surgery The

condition was known to physicians since antiquity, and ancient Indian, Greek and Arabic physicians had all described it and advocated its treatment by incision. The condition is twice as common in children as in adults. The sex incidence is equal in children, but males are more commonly affected in adults. Willensky, in some old statistics gives 201 cases in children under ten years out of a total of 300 cases. In this series the mortality was 29% in children and 25% in adults.

Aetiology—This will vary. But there are two chief types. A Pneumococcal and B Streptococcal (Haemolytic) as in the influenza epidemic of 1917—1918. In secondary empyema due to a lung abscess bursting in the cavity, or in an infected pneumothorax, staphylococci or other pyogenic organisms may be found, and in some secondary infections, putrefactive and foul gas forming bacteria may be present.

Pathogenesis—Infection can reach the pleura in one of six ways.

1 As a result of alveolar infection and then to visceral pleura. This is the usual pneumococcal pneumonia.

2 From peribronchial or interstitial lymphatics to pleura, as in haemolytic streptococcal broncho-pneumonia.

3 Rarely along blood stream. This is very uncommon without a pneumonic patch.

4 Small subserous lung abscess bursting in pleura. This is not always necessary as only subserous lymphatics containing infection can pour out infected fluid in pleural cavity, which was clearly demonstrated by Graham's and Blair and Block's experiments.

5 Occasionally sub-diaphragmatic abscess may burst in pleura. Chest wall abscesses, however, practically never give rise to an empyema.

6 From penetrating wounds and in haemothorax with secondary infection. Presence of blood in pleural cavity always favours occurrence of infection.

Pathology—Essentially empyema is an abscess of the pleural cavity. Amount of pus may vary from a few c.c.s to several hundreds of c.c.s. Exudates are always larger in streptococcal infections than in pneumococcal ones. This is because, the infection is peribronchial in streptococcal cases and alveolar in pneumococcal cases. The earlier the effusion in the course of the disease the greater the quantity and the later the adhesion which explains why streptococcal empyema is localized later than a pneumococcal one.

Early exudate may be serofibrinous, blood-tinged or distinctly haemorrhagic, more so in streptococcal infections as fluid after removal

separates in layers of thin sediment of pus below with supernatant serohaemorrhagic fluid. Later on this exudate becomes frank pus with lot of fibrin of greenish white colour. If there is secondary infection, the pus may be foul smelling and blackish green.

There is an enormous thickening of the parietal pleura sometimes even upto 2—3 cm s. There may also be fibrinous adhesions and pockets.

In pneumococcal pus, the pneumonia is usually in the stage of resolution when pus forms. In streptococcal cases pus is present in early stages before resolution in the lung takes place.

Symptoms and diagnosis—In lobar pneumonia, if fever goes up after coming down to normal, one should suspect empyema. Also if the symptoms are prolonged with increasing prostration, pleural pus is probably present. Streptococcal empyema is usually syn-pneumonic while pneumococcal pus is meta or post pneumonic. The usual methods of eliciting the physical signs and diagnosing pleural effusions are too well known and there is no need of mentioning them here. But a few general principles may be stated.

1 Level of fluid is horizontal if air is also present. Otherwise it is higher on axillary border.

2 The amount of fluid determines the physical signs while symptoms are dependent on rate of accumulation.

3 Pleural effusions in children under the age of three are always purulent and usually so under the age of five.

4 Visceral pleura has no pain nerve fibres. Parietal pleura gives rise to pain only at site of irritation and is never referred. In diaphragmatic pleura, central portion pain is referred to the neck and in peripheral portion irritation, pain may be referred to thorax, lumbar region or abdomen. Neck pain in diaphragm irritation is in 4th cervical segment along edge of trapezius.

X-ray pictures and diagnostic aspiration are most important. But as Rigler has shown, pleural effusions if non-purulent and without adhesions may change position on repeated screening or photographs. Deeper collections may be mistaken for lung abscesses and indeed the two may be co-existing. Occasionally, if the exudate is very large, it may show transmitted cardiac pulsation on screening or even on palpation. Rarely multiple empyema cavities may be present, with different infection in each. I have seen one case like this in a child of eight years of age.

Complications—The following complications may be encountered —

1 Bronchial fistula

2 Empyema necessitatis. This may point anywhere, even in front in the second interspace.

3 Pericarditis

4 Peritonitis This may be either sub-phrenic abscess or general peritonitis This spread is usually through lymphatics Commonly, however, peritoneal infection travels to pleura through diaphragmatic lymphatics rather than the other way round

5 Septicaemia This is difficult to demonstrate in many cases

6 Bilateral affection This is commoner in streptococcal infections

7 Mediastinal abscess These are diagnosed usually on post-mortem examination and very rarely during life

8 Miscellaneous Complications such as meningitis or brain abscesses These complications are more common in bronchiectasis and rare in empyema

Treatment of acute empyema—It must be realized that empyema is not a disease, but a complication of another disease, usually pneumonia The two objects of treatment are of course, firstly to save life, and secondly to prevent chronicity Deaths due to massive exudate alone are fewer, but most fatalities are due either to further complications or due to unwise formation of an open pneumothorax by premature open drainage

Ever since times of antiquity, empyema has been recognized as an abscess of the pleural cavity and to be treated as such by drainage But special physiological considerations make special methods necessary as has been noticed for over a century Until recent times, the principles were not expounded properly and only newer or supposedly newer methods were advocated from time to time in cycles, only to be discarded later on for other methods of drainage We often find good coming out of evil, and the influenza epidemic of 1918 gave the American Empyema Commission unrivalled opportunities During this epidemic, haemolytic streptococcus was the common infective agent and the older method of rib resection and open drainage gave a mortality of 30% and in some series of cases, even as high as 70% The reason was that the abscess was incised before frank pus formed, unlike the ordinary pneumococcal cases in which drainage was instituted when frank pus was present When we remember the physiological considerations, it is evident that the high mortality was due to ignorance and in some cases the deliberate ignoring of the danger of a large open pneumothorax, before adhesions had formed, or mediastinum had become rigid as the result of inflammatory induration The patient's vital capacity and the amount of mediastinal inflammatory induration are important factors In any case it must be clearly realized that there must be no open operation in the presence of active pneumonia or in syn-pneumonic empyema, but it may be safer in meta or post pneumonic lesions If an open operation is performed comparatively late we have the following advantages —

- (i) The abscess becomes shut off by adhesions
- (ii) There is more lung tissue available for aeration as pneumonia subsides
- (iii) Mediastinum becomes less mobile because of induration
- (iv) Oxygen need of the body becomes less as metabolism becomes normal
- (v) Patient is better able to withstand shock of operation

Therefore we observe three chief principles enunciated by Graham in the treatment of acute empyemata, as follows —

- 1 Removal of pleural effusions or pus without creating open pneumothorax or open drainage in active stage
- 2 Early sterilization and obliteration of cavity by free drainage and irrigation of cavity, only at a suitable time
- 3 Maintenance of nutrition of patient

Therefore in the beginning, single or if necessary repeated aspirations are done. The figures given by Stone in the Military hospital at Camp Riley are very instructive. In the first series, when open operation was done, the mortality in 85 cases was 65%. In the second series, when more aspirations were done, the mortality dropped to 15.6% in 96 cases, and in the third series the death rate dropped to 9.5% in 94 cases. At another Military hospital at Camp Lee, the mortality dropped from 45% to 4.5%.

When an empyema is suspected, the first thing to do is to confirm the diagnosis by aspiration and a bacteriological examination of the aspirated fluid is made. There are certain precautions to be observed in this procedure which is sometimes referred to as thoracocentesis. The point of aspiration is in the lower part of the suspected collection, but in large cavities never lower than the 8th interspace in the posterior axillary line at the upper border of the rib. The point is infiltrated with 2% novocain as deep as possible in the chest wall and the aspirating needle is gently introduced. The fluid is withdrawn very slowly and at the first aspiration not more than 1500 c.c.s. should be withdrawn even if the cavity is very large, to prevent too much decompression. Before withdrawing the needle, a little absolute alcohol is injected into it and then it is quickly withdrawn. This is to prevent infection of the needle track. There is in certain cases, a marked fall of blood pressure, or even collapse and death, during aspirations of pleural effusion and this was at one time thought to be due to pleural reflex causing vagus irritation. It is now shown by Schlaepfer and Lilienthal that these accidents are due to air embolism of the brain. I have fortunately not encountered a case of this nature. According to Lilienthal, these rare catastrophes can be lessened by keeping the head of the patient on a lower level

in all intrathoracic operations This aspiration procedure is repeated from time to time as fluid collects and the aspirated material becomes thicker and more frankly purulent at each succeeding aspiration. Sometimes removal of the fluid is easier if it is replaced through another needle puncture by air or oxygen I had two cases in which repeated aspiration alone cured the condition and Graham says that 13% to 15% of cases can be cured in this way in streptococcal types

But in most cases, aspirations are only preliminary to operation of rib resection and open drainage and this is done only under the following conditions —

- 1 If, at the first aspiration, foul pus and gas come out, early rib resection is indicated
- 2 When acute condition has subsided and lung resolution has taken place
- 3 When the fluid which is aspirated is frankly purulent
- 4 When fibrin and necrotic tissue prevent successful aspiration by blocking the needle
- 5 In any case, an open operation is done if pus goes on forming after about two weeks of repeated aspiration By that time, adhesions are almost always formed and delay in operation entails the danger of empyema becoming chronic

Even after rib resection, it is very often advisable to resort to continuous closed drainage, through a long tube, in a bottle containing dettol or lysol lotion, and this drainage may sometimes be facilitated by syphon or suction drainage methods It is well to bear in mind, however, that suction if wrongly applied may lead to untoward complications and even rupture of lung and alarming haemorrhage have been reported

When open operation has been decided on, the rib resected is always chosen in the lowest part of the empyema cavity and in the case of a large parietal empyema, the 8th rib in the posterior axillary or mid-axillary line is chosen Although this opening in many cases is not in the dependent part, it is found that the diaphragm always rises up after drainage and an opening made lower than the 8th rib may consequently get blocked The patient is kept at the edge of the table for axillary line drainage or on the affected side if scapular line is chosen for dorsal drainage, with of course, the head on a lower level Whenever possible I have always used local anaesthesia by 2% novocain block with pre-operative sedation by morphia or nembutal In children or in very nervous patients, general anaesthesia has to be administered and gas and oxygen may serve the purpose admirably In any case, I

have always preferred chloroform to ether, as I have found that in the hot climate of India, ether does not work very well. At least two inches of the rib should be removed, but in children a smaller opening may suffice. After rib resection, the cut ends are smeared thoroughly with Bipp or Horsley's wax to prevent infection and necrosis and three intercostal nerves are paralysed by injection of 95% alcohol to prevent after-pain. Then the parietal pleura is punctured by an aspiration needle and presence of pus demonstrated. One must remember, however, that sometimes fibrin blocks the needle and no pus may come out although a large quantity is present. The pleura is then carefully incised with the needle in situ and as soon as pus starts to flow out, the forefinger is introduced in the hole and the opening enlarged slowly and pus is allowed to come out gradually. In pneumococcal cases, it is usual to see large masses of fibrin coming out through the opening and the expelling of these masses is sometimes easier if a patient under local anaesthesia is made to cough gently. When pus stops coming out in a stream, two tubes $\frac{1}{2}$ " in diameter are introduced in the cavity and care is taken to assure oneself that these tubes are well within the cavity but not projecting too far in. One or two side holes are always necessary. In children rubber catheters no. 16 in size may be used. Through the upper tube, 4 to 6 Carrel tubes are arranged inside the cavity and the whole thing is connected to a reservoir containing 5% Dakin's hypochlorite solution. The lower tube drains out pus and is connected to a bottle containing saline or dettol lotion. I have always started irrigation of the cavity on the second day of the operation, although Graham recommends it from the first day. Why one day's delay is recommended, is, because of the possible presence of a bronchial fistula in which case immediate irrigation may be risky. When Dakin's solution is introduced, it is always done very slowly at first and stopped immediately if the patient coughs, which means presence of a bronchial fistula, necessitating a few days waiting period before washing out is restarted. Again the cardinal rule in irrigating any cavity of ensuring that the outlet is twice as big as the inlet is always observed, especially in the chest, as otherwise danger of pleural reflex or air embolism of the brain is present.

The irrigation may either be continuous or intermittent and has the effect of (i) preventing secondary infection, (ii) completely sterilizing the empyema cavity, (iii) thinning out thickened pleura and allowing the lung to expand. Less and less solution has to be used as the cavity becomes smaller and usually in about 10 to 12 days time, there is no pus and no organisms when the irrigation may be stopped. Respiratory exercises are now started, such as blowing coloured fluid through Wolff's bottles or inflating rubber balloons. These exercises lessen the cavity and favour lung expansion. It is safe to discard drainage tubes only when an X-ray photo and physical signs show that the cavity is not larger than 10—20 c.c. capacity. Absence of pus and sterility of a large cavity are not always safe criteria for removing drainage tubes.

I have had no occasion as yet to treat a case of Bilateral empyema, but in case one has to do it, it would be safer to treat the worse side first

During all this treatment, our third object of keeping up the patients nutrition must be seen to, and as the daily Nitrogen loss in urine and pus may be 30 grms or more, a daily intake by the patient of 3000—3500 calories with sufficient proteins must be ensured. Fresh air and helio-therapy must also be resorted to. After open operation, the patient must gain weight by 2—5 lbs every week, till discharged from hospital

Prognosis—This is worse in children under 10 than in adults, because of complications. In America, the pre-Empyema Commission mortality in children was 51%. And it is reduced to-day to 11%. In adults, similarly, a mortality of 30% is brought down to 4—5%. It must be understood however, that patients do not die of empyema alone but always because of one of the complications mentioned previously. The average stay in hospital of most patients has been 30—40 days. It is not my intention in this discussion to lay stress on this or that method of closed or open drainage, but rather to bring out the three principles in the treatment of acute empyema, viz —

- 1 Removal of pleural exudate or pus without creating an open pneumothorax or starting open drainage in the acute or active stage of the disease

- 2 Early sterilization, and obliteration of the cavity by free drainage and irrigation only at a suitable time

- 3 Maintenance of nutrition of patient during this treatment

The prognosis is sure to be better under the above circumstances

I have made no mention as yet, about the sensational advance made in the treatment of pneumococcal and streptococcal infections as the result of the discovery of M and B 693 or sulphapyridine. This has undoubtedly reduced the mortality in pneumonias and has very probably considerably lessened the chances of empyema formation. But once pus has formed in the pleural cavity, sulphapyridine will only be useful as an extra aid in the treatment. Aspirations and open operation will not be entirely obviated. After operation, on the other hand, a course of sulphapyridine will quickly render the patient afebrile and hasten and facilitate sterilization of the cavity. The danger of causing Agranulocytic anaemia by too vigorous sulphapyridine therapy must not be forgotten

Chronic Empyema—I do not intend to go into any detailed study of chronic empyemas. I shall only mention the common causes and general principles of treatment. Any empyema cavity not healing in three months may be said to be a chronic cavity. The following are the causes of an acute empyema going on to chronicity —

- 1 Too long delayed operation of rib resection and drainage
- 2 Insufficient drainage due to a too small, too high, too low or too rapidly closed opening
- 3 Foreign bodies in cavity, such as drainage tubes, pieces of gauze, metal fragment, or rib sequestrum
- 4 Character of infection such as tubercle or Actinomycosis and reinfection
- 5 Bronchial fistula

Therefore it will be seen that 99% of chronic cavities can be prevented from forming, if acute empyemas are treated carefully

This complication of chronicity is rather rare in children. But in adults, patients have come back for chronic cavities even after 2 or 3 years of apparent cure of acute empyema. In most of these cases, the cause is usually premature removal of drainage tubes after rib resection.

The patient comes either for a chronic sinus or with symptoms of pus in the body, such as pyrexia, wasting, pallor, breathlessness, etc. The diagnosis is made by eliciting the usual physical signs and is confirmed by an X-ray photo and diagnostic aspiration. Rib sequestra may be difficult to demonstrate in an X-ray plate, because they may be small. It is also important to find out the size and shape of the cavity, by lipiodol injection and an X-ray plate, as treatment becomes easier with this information in hand.

Treatment—The first essential is adequate drainage, and for this a new opening may be required, if the first one is faulty in some way. Sequestra and foreign bodies are removed, if present, and all subsidiary cavities are converted into one, by the finger. Then all exudate is wiped out and granulations if excessive, may be gently curetted with a blunt curette. After this 6 to 8 Carrel tubes are placed in the cavity and Dakin's solution irrigation is started as in acute empyema. If haemorrhage occurs or if a bronchial fistula is present, irrigation may have to be stopped for some time. The first essential is to render the cavity sterile and for this, cultural tests are made from time to time. It has been found that if infection is got rid of, cavities, unless they are very big, close spontaneously by expansion of lung rather than by collapse of chest wall. The modern tendency is therefore to treat infection and leave the cavity alone till at least sufficient time is given for healing, which in comparatively symptomless cases may be 8 to 9 months.

If, as happens in certain cases, these cavities refuse to heal, other procedures may be required. These depend on the size of the cavity which must be found out first, by lipiodol injection. In small cavities upto 200 ccs capacity a modified Estlander operation of removing a few ribs over the

cavity may suffice as this causes collapse of the chest wall over it. In cavities larger than 200 c c s but less than 1000 c c s, firstly adequate drainage is instituted and then certain other operative procedures may be required. They are —(i) Decortication of Delorme and Fowler (ii) Discussions of Ransohoff (iii) An Estlander or Schede operation on the chest wall. In very large cavities, over 1000 c c s, if the above procedures do not succeed, Wilms or Sauerbruch thoracoplasty may be required. This however is practically never necessary in non-tubercular cases.

In the cases under my care, I have never had to perform yet any collapsing operation for non-tubercular cases, except a modified Estlander on two or three occasions.

As a brief summary, I shall now give a list of procedures, adopted during the treatment of empyemas and the conditions under which they are adopted. This list is modified from a similar one given by Lilienthal.

1 Aspiration (diagnostic) —Done in all cases, acute or chronic. Bacteriological examination is always made.

2 Aspiration (therapeutic) —Done in all acute cases, single or repeated as necessary, till a suitable time is reached for operation. In certain cases, this aspiration is done with replacement of fluid by oxygen or air.

3 Minor intercostal thoracotomy or pleurotomy —This is done in certain cases in children or in patients who are very seriously ill. A tube is put through an opening in the pleura in the intercostal space, with airtight closure and water seal drainage.

4 Resection of rib with periosteum —Done in all cases after acute stage is passed. Two tubes are introduced and Carrel-Dakin treatment is instituted.

5 Resection of ribs with periosteum —May be required in small and early chronic empyemas.

6 Collapsing thoracoplasty—

- | | |
|---|---|
| A Estlander | } Rarely required for medium and large chronic cavities |
| B Schede | |
| C Wilms (Pfeiler resection) | } Only required for tubercular cases |
| D Sauerbruch paravertebral extrapleural thoracoplasty | |

As I mentioned in the beginning, there was not sufficient time to collect and classify all cases. The number of cases that could be traced was 112. Out of these 78 were acute cases and 34 cases were chronic when first seen. The mortality in the first group was 7.7% and in the second group was 5.9%. Until the time I worked in the children's Hospital the majority

of cases were in children. But since then except in private practice, all the cases were in adults. I remember one interesting case in a child of about eight years, in private practice in which a cavity was drained with streptococcal pus in it. But after a time, as fever persisted an X-ray photo was taken which showed a second cavity on opening which pneumococcal pus was found. The child recovered completely after about 50 days' illness. The average stay in hospital of all cases has been about 40 days. I have had no case of bilateral empyema up to the present, fortunately. All the cases were treated strictly on the principles mentioned above and I have been quite satisfied with the results.

In conclusion, I must mention one historical case of empyema after streptococcal broncho-pneumonia, the case of His Late Majesty King George V. In December 1928, King George suffered from broncho-pneumonia giving rise to an empyema which was first aspirated by Sir Hugh Rigby, in consultation with Lord Dawson. The fluid was sent to Dr. Whitby (incidentally the discoverer of the bactericidal action of M. & B. 693 against pneumococci) who did bacteriological examination. After the acute stage passed off Sir Hugh Rigby did a rib resection. And about February 1929 King George went to Bognor Regis for convalescence. Unfortunately some time afterwards, the wound opened again and a rib sequestrum was detected for which another operation was done by the late Wilfred Trotter and then only the wound healed. I cannot help thinking that had a rib resection been done earlier than it was actually performed, His Majesty King George V would not have survived that critical illness.

I have to request you in the end, to overlook the many shortcomings in this paper, which I realize is far from what it should have been. I shall, however, have served my purpose, if the mortality of Acute Empyema is reduced as a result of the proper understanding of the essential principles involved in its treatment, so clearly brought out by Graham and his Associates.

DISCUSSION

PROFESSOR K S NIGAM spoke giving his experiences

DR M G KINI

Dr M G Kini observed that he had only 15 cases of empyema thoracis Dr Joglekar had given a comprehensive view on the physiology, pathology and treatment aspect of empyema thoracis Out of his 15 cases of empyema, there were 2 cases of empyema necessitans One in a child aged 4 years, and another in a man aged 25 years There were 2 cases of empyema as a result of liver abscess bursting into the pleural cavity and post-mortem specimens show how the pus finds its way into the pleural cavity Regarding a drainage tube getting into the pleural cavity as a result of inadvertence, he observed he had one such case and he had to remove the tube with the help of a cystoscope He asked the lecturer why he seals the ends of the bone with Horsley's wax after resecting ribs He observed that the persistence of sinus formation occurred in one case due to wheeling of ribs, result of an operation done outside due to inadequate removal of the length of the ribs He observed that he got very good results by simple drainage without washing the pleural cavity The pleural cavity can be considered as an abscess cavity, but he did not understand why it should be irrigated as in the modern treatment of abscess cavity sufficient drainage is all that is necessary Regarding the exercises for the lung he stated that in addition to the blowing out exercises, he also instituted sucking-in exercises and this could be easily done by changing the connections and is a very useful method especially in the case of children who take great delight in this aspect of treatment It is simple and attractive He observed that majority of the empyema cases came long after the pus had accumulated in the pleural cavity

DR R N COOPER

Mr President, ladies and gentlemen, before I come to the subject-matter in so far as it relates to my personal experience, I want to offer a few remarks on some of the observations made by the previous speakers

I feel that every case of death resulting from aspiration of pleural exudate cannot be ascribed to air embolism The first case of death on the operation table in the K.E.M Hospital after its opening was due to simple aspiration of a pleural effusion As the needle entered the cavity, fluid began to pour out and the patient collapsed and died There was no possibility of air-embolism from a punctured pulmonary alveolus I agree that the term pleural shock may cloak our ignorance

I also take exception to the statement that not more than 1500 c.c should be aspirated at a sitting There are definite indications for stopping aspiration at any stage irrespective of the quantity aspirated It is much more important to remember that stopping the aspiration at a stage when the pleural effusion is still under positive pressure is disastrous The purulent effusion under positive pressure leaks along the line of puncture and infects the soft structures producing a cellulitis of varying intensity depending on the type of organisms present If you are using a Potain's aspirator you find that fluid at first pours out into the bottle almost continuously and you hardly need any suction at all This indicates that the fluid is under positive tension However when the tension has fallen sufficiently, you find it necessary to create a vacuum in the bottle before any further fluid will pour out It would be best not to stop a diagnostic puncture until such a condition is established if leakage along the line of puncture is to be avoided

In doing repeated aspirations in children it is well to remember a little tip given by Mr Tudor Edwards. Make a small knick in the skin with a knife before you push your trocar in. Do not let the skin puncture heal up. A few granulations in this area will act as an effective barrier against infection of soft structures on subsequent aspiration. Further this open raw area in the skin ensures a painless subsequent aspiration. The child dreads a puncture and if every subsequent puncture is to be magnified into a major operation the child gets really frightened.

As regards the blowing of toy balloons or coloured fluids through Wolffe's bottles I find that there is some misunderstanding. An objection has been raised against the form of treatment because it is argued that it ensures a big expiration of air and not inspiration, and it is a deep inspiration that is required to obliterate the pleural space. It is for this reason that the inhalation of CO₂ mixture is recommended. I fail to find the difference. After all in life, you can get out of it, as much as you are prepared to give. And I feel that the bigger your blow-out the bigger and deeper will be the next inspiration of air.

I never have had the opportunity of doing aspiration in cases of syn-pneumonic empyemas. The explanation is very simple. It is the physician who is first called to see such a case, and if there is one operative procedure which the physicians believes to belong to him by right it is aspiration!

The Empyema Commission in America proved definitely that the best way to treat cases of syn-pneumonic empyemas is by repeated aspirations until such time that the exudate becomes frankly purulent. There has lately been an attempt made to ascertain this point by determining the specific gravity of the fluid aspirated on each successive occasion. The underlying idea is that the specific gravity of the effusion increases as the exudate ages. The specific gravity after a few aspirations becomes constant. This level is reached when the exudate becomes frankly purulent. This would also be the stage for open operations. I have no experience in this matter. I have more experience with children than with adults. In children even in meta-pneumonic cases and even where the causative organism is a pneumococcus it is best to treat the case by repeated aspirations. Many such cases get cured by simple aspiration alone. If however these aspirations fail to give relief or if the exudate is too thick to flow out, it is best to resort to an operative drainage, either with or without resection of a small piece of a rib as determined by the condition of the patient. The principles underlying the treatment have already been mentioned namely drainage and irrigation of cavity to obtain sterilization of the cavity. I may mention that I never attempted irrigation of the cavity in children. The maintenance of even one tube is a problem in a fretful and frightened child. The adoption of an additional tube for irrigation with neutral Dakin solution simply adds to our difficulties. Without irrigation these cases, at least in children, have done very well. I do not know of a single case which has become chronic for want of irrigation. There have been cases of chronic empyema in children but these have been due to other causes. I have had more than once a peculiar series of events in treating empyemas of children. A neglected and an emaciated child is brought up. A syphon drainage leading into a bottle is adopted. The child appears to get along very well. Then for no reason whatsoever the child begins to swing a temperature and gets emaciated once again. Somehow the pendulum again swings in the opposite direction and the child gets well. I have not been able to ascertain the cause of this peculiar development. I have not seen a case of total empyema either in the child or in the adult.

In the adult however I have treated a case of basal empyema. The collection was between the base of the lung and the right cupola of the diaphragm. This followed an operation for internal piles. Returning home after an uneventful recovery, the patient

developed a rigor with fever about ten days later. Fever persisted with vague signs at the base of the lung. Skiagraphy revealed a basal empyema. This was drained. Streptococci were obtained from the pus and not *B coli* as expected.

I have had only one doubtful case of mediastinal empyema. However the patient recovered without an operation or without any manifestation of the evacuation of the collection in any other way. In adults sometimes huge collections of pus are encountered without any symptoms except dyspnoea on exertion. Treatment by aspiration and subsequent injection of air to produce an artificial pneumo-thorax has been mentioned. My experience of a such a treatment has not been at all happy. I have watched a certain physician adopting this line of treatment. Every time with the induction of artificial pneumo-thorax there were signs of acute distress and collapse. I have therefore steadily refused to do any air replacement for the fluid withdrawn. Possibly the only indication to introduce a little air after aspiration would be in those cases where the patient begins to cough violently. The removal of the fluid causes a sudden expansion of the lung and a fit of coughing is induced. The injection of a small quantity of air under such circumstances does some good.

Even in adults I have not used Dakin's solution for purposes of irrigation. This requires a certain amount of supervision which may not be possible under the circumstances under which I have to work. Only in one case before embarking on a major operation for a chronic empyema I have used irrigation with Dakin's solution.

A case of an acute empyema after an operation for its relief may be said to have become chronic if the discharge persists for a period of three months. It is of prime importance to ascertain the cause of such a chronicity. A skiagraphic study after the injection of a radio-opaque substance is very important. A solution of Sodium Iodide 10–20% in strength is found to be very useful. It is readily sterilised and is cheaper than certain preparations sold in the market. It is best to have a series of pictures in different positions. Stereoscopic pictures are a great advantage. However in this respect we are always at war with the radiological department which is always for economy. In a good many cases all that is needed is an efficient drainage in a more suitable position. I have no experience of the operation of decortication. The first case that was treated for chronic empyema was well over fifteen years ago. He was a negro seaman. A modified multiple rib-resection was done to obliterate the cavity. This was a success, subsequently the same operation was attempted in three other cases. These were done in two stages. Two of these three cases stood the first stage well, but both succumbed after the second stage operation. Only one recovered.

I have had only one case of chronic empyema with a bronchial fistula. Generally such fistulas close up on their own in about six months. Should the fistula persist an operation is required. In this particular case there was a small associated empyema cavity of not more than 100 c.c. capacity. Three ribs had to be resected. The fistula was dissected off from the skin right up to its connection with the lung. The internal end was ligated and the fistula excised. The result was very satisfactory.

Attention to nutrition has been stressed by Dr Joglekar. Emaciation in children is a marked feature. The adequate amount of protein and carbohydrate must be given. A diet with a high caloric value must be built up. One way of increasing the carbohydrate content is to give lactose as suggested by Graham. Add lactose to the fruit juice. It does not make the fruit juice particularly sweeter. Lactose is much less sweet than glucose. Hence such a mixture will not meet with any opposition from the child.

Left sided empyemas are more troublesome than the right sided. Pericardial complications have followed left sided empyemas more often than right sided.

An impression has been created in our minds that the incidence of Empyemas has fallen since the advent of M & B 693 preparation. Time will prove how far that impression is correct.

DR A V BALIGA

I am not a chest surgeon but in common with general surgeons, I have handled a few cases and my experiences is confined to 14 instances of acute empyema. One of these was a foetid type and the patient died within 24 hours of the operation.

By the time the surgeon is called to see a case of empyema, it is practically every time a meta-pneumonic type and often the pus is thick and pleurotomy and drainage is indicated. All the same a routine aspiration of the chest must be performed by the surgeon and operation undertaken only if the purulent material is thick and the mediastinal fixation established. The aspirated material is sent for bacteriological examination and a culture obtained and is preserved for the preparation of an autovaccine subsequently if that be deemed desirable.

Capt Nigam mentioned that the dependant lung should function extra well and that our patients could be put on the sound side during operation. This is a dangerous position on the table. In my cases due to a mistake, once the house surgeon and the second time the nurse put the empyema patient on the sound side and there was a marked respiratory embarrassment immediately and the doctor and the nurse came in for a severe rebuke. Personally I prefer the patient on the back with the affected side of the chest well beyond the edge of the table and the head end of the operating table higher. Twice I had the patient sitting up leaning forward on a support.

In adults I use local anaesthesia, and whereas previously I was using an oblique incision along the rib to be resected, recently I have changed to a vertical cut for obvious reasons. Before the proposed rib is resected I put in a needle in the pleural cavity and establish the presence of pus, once after a previous aspiration 3 days previously I found that part of the pleural cavity completely obliterated and I had to seek pus elsewhere in a loculus—hence this special precaution.

I may emphasize here that in children, other things being equal, there is a great probability of a cure being obtained by repeated aspiration alone even in the presence of thick green pneumococcal pus. I have treated only 3 children, all with aspiration. The first one was a total pneumococcal empyema on the left side and it was an empyema necessitatis of the pulsating type of 6 weeks' duration. Two aspirations done at intervals of 5 days yielded on both occasions a large quantity of thick green pus. I decided on an operation and after rib resection and opening of the pleural cavity I got only a teaspoonful of pus. Evidently the operation was unnecessary. The condition cleared up and after that I treated my other two cases with aspiration alone and hence my optimism for a good outcome for aspiration in empyemata in children.

As a routine in the post-operative period I insist on blowing exercises like blowing bubbles through Wolfe's bottle. Capt Nigam does not find it necessary and suggests instead deep breathing exercises with the help of carbon dioxide cylinder if necessary. I may point out that the idea of blowing exercises is to increase the intra-pulmonary pressure and force the pleural surface of the lung towards the chest wall. This cannot be expected with breathing movements alone. At this stage I should cite the instance of a fussy young lady who after rib resection for empyema did not like blowing bubbles through Wolfe's bottle and called it childish. She almost felt insulted. Both clinically and by X-ray screening and radiography I found that she was making no progress. At

this stage I insisted on her co-operation and she regularly carried out the blowing performances with very good results, the lungs soon beginning to expand and the amount of purulent discharge getting less. She expressed to me that the bubble blowing was no more a childish game for her and that she did it with great enthusiasm.

The drainage tube I generally connect with a glass connection which again has a long rubber tube attached, the end of which dips into a lotion in a bottle tied to the side of the cot. I do not employ any elaborate syphonage system. Great care is needed to see that the drainage tube does not slip into the pleural cavity. I had one instance of this happening in my experience, my house surgeon not knowing about it at all till in view of the unsatisfactory progress of the patient I had a radiogram taken. The tube was found with a safety pin attached.

Another regular feature in my post-operative care is the washing out of the pleural cavity after the first 24 hours with Dakin's solution. As two speakers have expressed before me, it may be it is not necessary. But I have employed it in every adult case with no regret whatever and with happy results. I must admit I have no observation in a controlled series where irrigation was not carried out. But in view of the fact that a chronic empyema results in a number of cases due to thickened pleura not permitting pulmonary expansion, it stands to reason that it is worth while washing the pleural sac with Dakin's solution which dissolves fibrin on the pleural surface and thus makes it possible for the lung to expand and obliterate the pleural space.

Lastly a word about autovaccine. Whenever the progress of the patient after rib resection and drainage is not satisfactory enough I have a recourse to autovaccine therapy and in two of my cases autovaccines definitely appeared a material aid in the recovery of the patient.

DR S P SRIVASTAVA

Mr President,

I had occasion to treat a few cases of empyema and I wish to tell you how I dealt with them.

Most of my cases were meta-pneumonic except one case where the infection was streptococcal and pneumococcal combined and one of Empyema necessitatis which was located in the upper region of the chest and the pus had come beneath the skin. There the infection was *B. Coli* and *Pneumococcus*. In most of these meta-pneumonic cases after having diagnosed the case I always did aspiration and all of these cases got well and cured. I had to do excision of the rib only in the case of localised Empyema where the rib had been necrosed and the cavity was drained. In most of the cases there was pus in the whole of the pleural cavity and repeated aspirations were enough except in one case where the pus went on becoming thicker and thicker and after the last aspiration the patient said he would not submit to any more aspirations or operation when advised. He went out of the hospital and after a month or so I saw him quite healthy and was all right. So personally I think in places where arrangements are not very adequate regarding operation cases of Empyema if treated by repeated aspirations should get well. Resection of the rib should not be done nor is it required in most cases. In bilateral empyema, I think repeated aspiration will be equally useful.

The other thing is the question of closed drainage. Personally I think drainage by excision of a rib is better than closed drainage when it is required. You can excise the rib and put a broad rubber tube and connect it with another rubber tubing and a Y

shaped glass connection through which water flows. Here there is Suction drainage and there is no chance of the tube blocking or any difficulty in replacement if the tube is pulled out. When the condition of the patient is not satisfactory repeated aspirations should take the place of closed drainage between the ribs. The other type of operation that I have seen abroad is closed drainage by trephining a hole in the rib and passing a rubber catheter through it. Here there is an advantage over a rubber catheter being passed in between the ribs, as it is not liable to be pressed and obstructed.

I have done in a few cases irrigation and personally I think it gives shock. The patient developed high temperature after irrigation in every case. In the case of chronic empyema the period of three months suggested is too short and I think a period of six months should be allowed before a major operation is undertaken. Of course investigation might be done in the mean time to ascertain the cause of the trouble.

DR SURYAVANSHI also gave his views on the subject

DR KAPUR

I want to relate one case of empyema, with regard to the question of irrigation. I have had one very sorry experience. Since then, I feel chary of irrigating the empyema cavity. A great public worker came up with well established empyema. I did a rib resection and was daily irrigating the pleural cavity. He was improving till one day—I think 8th or 9th day after the resection—immediately I had finished irrigating the cavity, I found the man twitching. This twitching became more and more wide spread till within half an hour the man became comatose and he died within 24 hours. The causal relation between irrigation and supervention of twitches was so obvious that even the attendants began to suspect that there was something noxious in my irrigation fluid. They enquired whether I had not put anything strong in the irrigating fluid. Since then—it was a private case—it caused me a great deal of unpopularity and all that, I have stopped irrigating these cavities. I think the cases do just as well with irrigation as without it.

DR JOGLEKAR in reply

Mr President and Fellow Surgeons,

I am very fortunate that the criticism of my paper has been very mild. Most of the speakers have agreed with what I have said, and the objections raised by some speakers have been answered by others and therefore very little is left for me to reply to. I shall deal with the questions in the order in which they were raised. Capt Nigam expressed the opinion that dependent lung has more aeration, and therefore it is better to keep patient on sound side instead of on affected side in rib resection for empyema. He has not given any Physiological explanation for this, and his question is answered by Dr Baliga, who quoted a case, as to why it is better to keep the patient on the affected side during empyema operations. In any case it is better to stick to that procedure which one has found safe. The second point raised by Capt Nigam, about the explanation of the cause of sudden death in pleural aspirations, I am afraid, not being a physiologist, I cannot give any authoritative opinion, but I am only repeating Lalenthal and Schlaepfer's remarks. They say that in many punctures of the pleural cavity the needle goes through pleural adhesions into lung tissue and air enters directly into the pulmonary vein, from where it goes straight into the left ventricle and to the brain, causing sudden death. The amount of air that can safely be injected into the pulmonary vein is very much less than the quantity that can be introduced into a systemic vein and that

is why air embolism is much more frequent in thoracic operations than in abdominal operations. Capt Nigam's third point of making patients do breathing exercises instead of blowing fluid through Wolff's bottles in order to cause lung expansion, has been answered by Dr Cooper, Dr Baliga and Dr Kini. I agree with Dr Cooper when he says that you can take out only as much air from the lungs as you put in. For this reason, I think blowing coloured water from one bottle into another is a more interesting form of deep breathing exercise and therefore readily adopted, especially by children. I ask the patients to transfer the fluid from one bottle to another in one breath and to do this they have to take a deep inspiration first.

I agree with Capt Nigam that in chronic empyemas, decortication operation of Delorme and Fowler is shock producing and dangerous. I have not done any such operation as yet, but I only mentioned it as a procedure which may sometimes be required. The necessity for this operation has been reduced very much in recent times as irrigation with Dakin's solution is instituted oftener. And this brings me to the next point raised by Dr Kini and Dr Cooper as to the necessity or otherwise of Dakin's solution irrigation. This question is partly answered by Dr Baliga and Dr Suryavanshi. I know there are cases where irrigation is not practicable and these appear to heal just as quickly. But I think that the reasons I mentioned in my paper in favour of irrigation, viz, (1) Renders cavity sterile, (2) Prevents secondary infection, and (3) Thins out thickened pleura and dissolves fibrin masses, are worth remembering especially the last one. The effect of thinning out thickened pleura is to reduce the chances of the empyema becoming chronic, and to allow closure of the cavity by expansion of lung rather than by collapse of chest wall, and therefore surgeons who rely on irrigation usually treat infection and leave the cavity alone which they know will in time be filled by expanded lung. Naturally this thinning out of thickened pleura by Dakin's solution, removes the necessity of decortication, discission, or collapsing operations to a large extent. There is one important proviso about the solution used for irrigation. This must be the real Dakin's solution and neutral to phenolphthalein. Dr Shrivastava mentioned a case where irrigation caused severe reaction. He did not use Dakin's solution, but used Eusol which is acid in reaction because of the boric acid content in it. I can however understand Dr Cooper's difficulty about getting real Dakin's solution. The preparation of it requires a lot of care and supervision. In the beginning of my career at the J J Hospital, I had the same difficulty. But being enthusiastic, I went to a chemical factory myself and I showed them the method of preparation of this solution and arranged with them to supply me per week with six bottles of concentrated solution which I diluted myself afterwards. Now this factory is closed and I am finding some difficulty about the supply again. I think, however, that if real Dakin's solution is not available it is better to irrigate with 1—1000 acriflavine saline as mentioned by Dr Suryavanshi. Rather than use irritating fluids, it is better not to irrigate at all.

Dr Kini asked why I used Horsley's wax for the cut ends of rib. The reasons are two. Firstly, because of the carbolic acid in Horsley's wax, the chances of bone infection and sequestrum formation are reduced and secondly Horsley's wax by killing osteoblasts prevents new bone formation. This is why the wax is used also in amputations where bone spur formation from cut end of bone is to be prevented. The use of this wax on cut ends of rib prevents too early closure of the opening and consequent pressure on the drainage tube.

Dr Cooper asked why restrict yourself to removing only 1500 ccs of fluid from pleural cavity, if more will come out easily because it is under pressure. This figure 1500 is mentioned by Graham himself and of course may be varied according to circumstances. The point to remember is that too much decompression must not be done at one sitting. Dr Cooper mentioned a case in which a patient had a large pleural collec-

tion and wondered why he had no symptoms. This is not difficult to understand when one remembers that symptoms depend on rate of collection and not on amount of fluid. If the fluid collects very very slowly, one lung may be completely collapsed and still there may be no symptoms. I agree with Dr Cooper that it is better to use oxygen rather than air in replacing pleural fluid, as oxygen is absorbed more quickly and air is sometimes more dangerous. I also agree with him that Sodium Iodide solution is just as good as Lipiodol as an opaque medium in Röntgenology.

Dr Baliga suggested that the use of M & B 693 or sulphapyridine reduces the incidence of empyema. I mentioned in my paper that M & B 693 has certainly brought down the mortality figures in pneumonias and I believe has lessened the chances of empyema formation. But it is a little too early as yet to give a definite opinion on the second point.

I agree with Dr Shrivastava that repeated aspiration is curative in many cases. I have two cases in which repeated aspiration alone had sufficed. Graham says that 12% to 15% of empyemas are cured in this way. The second point of Dr Shrivastava that open drainage is better than closed drainage is answered by himself when he says that he uses suction methods. I think suction drainage is the same as closed drainage as outside air is not entering the pleural cavity.

I have not seen any rib trephine operation mentioned by Dr Shrivastava and so I can give no opinion about that.

About Dr Kapur's case of death following irrigation, I do not think he should blame himself. There might have been another cause for the fatality, and I believe, just as one swallow does not make a summer, one death should not discourage him from using irrigation again.

DR S R MOOLGAVKAR, the President, concluding the discussion, said

Ladies and Gentlemen,

We have been listening to a discussion on Empyema thoracis which had been introduced by Mr Joglekar.

There is not really much that has been left unsaid. I do not wish to waste your time by going over the same ground again. I shall touch on a few points only.

I certainly agree that aspiration should be tried out first and in many cases is this all that is necessary. It is generally agreed that a putrid empyema due to anaerobic infection demands incision. I remember a case as far back as 1919 of a Marwari who had a small empyema. I aspirated this, removing about 4-6 ozs of putrid and most foul smelling pus. The stink suggested to me the use of Iodoform emulsion. I therefore injected about 5 cc of a 10% iodoform emulsion into the cavity. I expected the symptoms to return soon afterwards, to my surprise there were no further symptoms and the patient got quite well and is quite free up to this date.

When aspiration does not suffice, an opening has to be made. The situation of the opening will depend on the situation of the empyema. Other things being equal, I prefer a more posterior opening in the most common situation of empyema.

Regarding the question of irrigations I am still very conservative and I consistently use them. I do not, however, use the continuous or intermittent irrigation but use the ordinary can and nozzle irrigation once or twice a day according to the severity of the

case One thing that I particularly look to is to see that the can is not held more than one foot above the level of the opening The stuff that I use for the irrigation is Chlorogen which is a strong solution of sod hypochlorite but unlike Dakin's is strongly alkaline This alkalinity helps to dissolve the fibrin The strength used is $\frac{1}{2}$ —1 oz of chlorogen to a pint of water

I have found that most cases heal well In the case of the larger accumulations, blowing into bottles or blowing up foot-ball bladders or toy balloons is a great help It is very rarely indeed that a limited thoracoplasty like Estlander's has to be done The few cases of bronchial fistula that I have come across have fortunately healed without needing any special operation Fortunately I have had to do no decortications, etc

In children aspirations alone usually suffice, but sometimes you have to open these also I remember the case of a child which after opening progressed well up to a certain point but after that slowed up I felt that something more should be done about it Naturally with a child of about two years one cannot give a bottle to be blown into or ask it to take respiratory exercises I gave it therefore a therapeutic pinch which made it cry vigorously, This served to inflate the lung and its judicious daily use led to a happy result

I may here draw your attention—which probably is quite unnecessary—to an excellent review of the treatment of empyemas in the Jan 1941 issue of Surgery, Gynæcology and Obstetrics

OBSERVATIONS ON THE USE OF COTTON THREAD AS A SUTURE MATERIAL

BY

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A close study of infection of wounds, poor wound closure, disruption of wounds and the absorption time of absorbable sutures too soon convinces one the ideal suturing material has not yet been found. So called catgut to-day is probably more widely used than any other suture but its high cost, the marked tissue reaction caused by the foreign protein introduced as well as the marked reaction and serum accumulations caused by the iodine, copper, solution of formaldehyde, tannates or chromic acid salts with which most catgut sutures are treated convinces one that it leaves a great deal to be desired. When one remembers as Priestley's (1) reports at the Mayo Clinic, "Labels which indicate the time necessary for absorption of catgut are entirely fallacious in so far as the human being is concerned," and, "Variations among individuals in the absorption time is great," we may wonder why catgut continues to be used at all. One explanation lies in the fact that physicians of to-day have been taught by the older surgeons and pathologists to fear "foreign bodies" in healing wounds. The fact that any suture used is a foreign body has been forgotten while the more important fact that some foreign bodies are inert and cause no appreciable reaction in tissue has never received proper recognition or emphasis. This 'Foreign body' teaching coupled with the improper use of non-absorbable sutures has justified fears expressed in their use.

I should like to report my observations on the use of cotton thread as a suture material. The use of cotton thread as a suture is not new. Sushruta about 500 B.C. recommended its (2) use. Ginkovskiy (3) after experimental work advocated its use in man. The ideal suture should be pliable, easily prepared, easily available, inexpensive, should tie securely, should not excite reaction in the tissue, should maintain its strength for a known predictable period of time in all patients and should show no incidence of infection or sinus formation. In my experience with catgut, stainless steel wire, linen, silk and cotton—cotton more fully fulfills these requirements than any other suture I have used. Cotton is very pliable, is available in the bazaar of any village, is easily sterilized by boiling for 20 minutes (4) and may be re-boiled repeatedly without appreciable loss of strength. Cotton is very inexpensive—400 yards of any good English or American make can be purchased for four annas. The knot is secure when properly tied, the square knot is easy and safe, the triple throw knot is the safest. The ends may be cut on the knot without fear—indeed no ends should be left. Cotton has

proved to be one of the most inert suturing materials used I have never seen the gummy exudate so common on opening recent wounds sutured with catgut and have not had any serum accumulations Meade and Ochner (4) graded the reaction of tissue to implanted sutures according to the amount and persistence of leucocytic infiltration, amount of serum and fibrin, the appearance time of fibroblasts and the length of time to produce final healing Catgut, by producing the most reaction and the slowest healing, was graded 4, linen 3, silk 2, and cotton, producing the least reaction and earliest healing, 1

Cotton maintains its strength for a known predictable period of time in all patients The tensile strength of cotton increases 10% after boiling 20 minutes When placed in tissue it loses 10% of its tensile strength at the end of 14 days This is contrasted with catgut which loses from 50—70% at the end of 14 days (4) Follow up studies on hernias (5) (6) show 9% less recurrences with a non-absorbable suture of predictable strength as compared to chromic catgut

Cotton shows a low incidence of infection and has not shown any evidence of sinus formation in infected cases Meade reports 196 cases in which 191 healed by primary intention—an incidence of infection of 2.5% The infected wounds healed readily without sinus formation and no sutures were extruded We have used cotton at the Miraj Medical Centre now in 101 cases Healing by primary intention took place in 98 cases showing an incidence of 3% infections This compares very favourably with infections in slightly over 10% of cases in which catgut was used by the same surgeons The incidence of infections in clean wounds depends on many variable factors but practically all series of comparisons between catgut and non-absorbable sutures have shown a definite advantage in favour of non-absorbable sutures and this is a rather widely accepted fact particularly in America Sullivan (5) in a study of immediate post-operative complications in 2,000 inguinal hernias found infections with silk was half that of catgut, one third that of kangaroo tendon or ox fascia, and one-fifth that of auto-genous fascia Goff (7) in a study of 3,000 abdominal incisions at New York Women's Hospital found the average incidence of faulty wound healing from all causes closed with absorbable suture material to be 21% while those closed with non-absorbable sutures was 4.3%

Cotton is an inexpensive, easily obtained, readily sterilized suture of predictable strength in all patients and shows a low incidence of infection Before these results can be achieved it must be pointed out and constantly brought to mind again that the technique of suturing with cotton is quite different from that used with catgut This is most important A man who has used silk as a suture will have no trouble changing to cotton but a man who has always used catgut must be willing to not only be patient when he pulls too hard on cotton sutures and breaks the thread (it is the man behind

the suture who does the breaking) but he must also realize that the way of suturing and tying with cotton is different and if he is not flexible enough to adopt a new technique, he should never try to use cotton or his dissatisfaction will be great and his results poor

Halstead (8) pointed out the technique to be used with non-absorbable sutures and, in the main, this must be rigidly adhered to. Many men will modify the technique slightly here and there to conform with their own ideas and then cannot understand why their results are poor. This leads to rejection of the suture when in reality the surgeon is at fault. The rules to be followed are —

(1) Only interrupted sutures are to be used. I have modified this and use a continuous cotton suture on the peritoneum and have not seen any ill effect from this as long as the suture is not pulled too tight. But every time I have attempted using continuous sutures elsewhere, I have had trouble. The only real advantage of a continuous suture is that it saves a slight amount of time (9)—our aim is not the fastest surgery but the best surgery

(2) Never use buried absorbable sutures with buried non-absorbable sutures

(3) Never use coarse suture material

(4) Never bridge over a dead space as a chord subtends an arc

(5) Avoid mass ligatures

(6) Never use tight sutures

In cotton 60 has been recommended for ligation of small vessels, 50 for skin, 30 for peritoneum and fascia, 20 or 10 for retention sutures if these are used. These sizes were 6 cord thread. I have used J. Carlisle, Sons & Co. thread which is 4 cord machine cotton thread. I use 30 for fascia and peritoneum, 40 for ligatures, subcutaneous and skin. I never use retention sutures. In using cotton thread it should be emphasized there is practically no loss of tensile strength at the end of 14 days in tissue. This means, compared with catgut which loses from 50—70% of its tensile strength at the end of 14 days, that a much smaller suture can be used originally. This is a decided asset in that less suture material is left in the wound and gentle handling of tissue is demanded or the suture breaks but for a man who has been used to catgut with an initial strength much greater it will demand patience until he has adjusted his 'pull' to the new tensile strength. To do this quickly and easily he should give up using catgut altogether while working out the new technique. Occasionally it may be necessary to start using coarser sizes than those recommended and quickly work down to the right size. I have repeatedly seen men use catgut in an

operation and then attempt to use silk or cotton and break suture after suture only to give up in disgust and call for catgut. This is not the fault of the suture but of the surgeon using it. Repeated experiments (10) have shown fascia will not hold a suture with a tension of 5 pounds long enough for healing to take place so sutures with the ridiculous tensile strength of 12—16 pounds are absolutely unnecessary as much of this strength is lost in the tissues before healing takes place. The strength of a suture is about 75% greater than a single strand therefore theoretically much finer sutures than are now being used could be used with good results providing their strength is predictable in all patients for a known length of time.

Cotton sutures are usually cut about 18—20 inches long-threaded through the needle—and the suture and needle through a piece of gauze which is then sterilized. Eight or ten such sutures are in each packet of gauze and are used as needed. Gauze is used as finer woven cloth makes the suture difficult to pull out. Sutures are usually used only once or twice and tied by hand. (The holding of sutures by hemostats or forces except at the end of the thread is to be severely condemned as this weakens the suture where it is grasped no matter how careful one may be.) All of these measures save time at the operating table as you will use a great many more sutures with cotton than you do with catgut. I also have cotton on a teak-wood paddle 9 inches by 3 inches wide. Pieces of gauze are inserted at the ends of the paddle before winding the suture—this prevents the wood from swelling and breaking the fibres of the suture. The paddles are previously boiled 5 hours with frequent changes of water to remove any juice from the wood that might be harmful. Paddles 9 inches long readily permit the cutting of a suture 18 inches long should you run short on sutures. Cotton is so cheap no effort is made to tie with a short end as is done with catgut. I have sizes 40, 30 and 10 on metal spools—the metal spools vary in size for easy identification. These spools are used in the hand for ligatures as indicated. Black cotton is used as white becomes red coloured and loose ends may be lost in the wound.

I always use interrupted subcutaneous sutures to close Scarpa's fascia. All interrupted sutures are placed so the knots are buried—thus no knots are felt in the wound. I apply Tincture of Benzoin after the wound is closed and wait a moment for it to dry. Sutures are removed the fourth or fifth post-operative day when they are painted with iodine, scissors placed against the sealed skin edges as the suture is pulled out. The subcutaneous sutures then hold the skin approximation. On visible parts as neck or face skin sutures are removed within 24—48 hours as the skin edges are then sealed and no pin point suture scar results.

One hears a great deal about the use of non-absorbable sutures in the presence of infection. Infected wounds should not be sutured no matter what type of suturing material is used as pus accumulates under tension;

toxins are absorbed, organisms may be forced into the blood stream, death of tissue takes place and the wound breaks open or must be opened. This happens no matter what suture is used. Contaminated wounds may be sutured with cotton with a greater assurance than with catgut as there is no irritative action nor are irritative chemicals present so that fluid collections which favour infections are not present. I have repeatedly buried cotton in wounds such as exist in ruptured appendices or abscesses and have not yet had a suture extruded or infection take place. Such wounds are not tightly closed in the presence of pus or active infection and should not be no matter what suture is used.

Summary—Cotton is an inexpensive, easily prepared suture with a low incidence of infection and a predictable period of known strength in all patients.

A series of 101 patients using cotton sutures with an infection of 3% is presented. This is a considerable lower rate of infection than the same surgeons have had using catgut.

The technique in the use of cotton is quite different from that used with catgut. This is important and must be recognised for if a surgeon is not flexible enough to change his technique and uses cotton improperly bad results will surely follow. Mastery of the technic of cotton suturing demands patience on the part of the surgeon.

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 - 3 GINKOVSKIY, V M, *Cotton Thread as a Suture*, *Vestnik Khir*, 44, 1936, 27
 - 4 MEADE, W H AND OCHSNER, A, *Spool Cotton as a Suture Material*, *J.A.M.A*; (Dec 16), 1939, 223-31
 - 5 SULLIVAN, J E, *Immediate Post-operative Complications in 2,000 Inguinal Hernias*, *Surgery, Gynecology and Obstetrics*, 69, (June) 1939, 1059
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 - 9 DEW, H R, *Closure of Surgical Wounds*, *Australian and New Zealand J Surg* 8, (Jan) 1939, 315-317
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A UNIQUE TYPE OF INTUSSUSCEPTION OF THE SMALL INTESTINE

(Cricket-Bail Type)

BY

R N COOPER, M S (LOND), F R C S

A Parsee youth aged 25 years was first seen by me on 4—8—1940 for pain in the abdomen, a little to the left of the navel. The pain was of a year and a half's duration. According to his statement it was present constantly. He was very definite that a certain degree of pain was always present in that region. At times the pain was accentuated. He was often constipated and took purgatives frequently. The pain was somewhat relieved after a purgative. The patient was five feet high and weighed 118 lbs. He had not lost weight. His Blood pressure was 115/80. He worked as an Inspector in the Tramways Co. There were no previous illnesses of any description. He had been examined by a consulting physician who had diagnosed his present condition as neurosis.

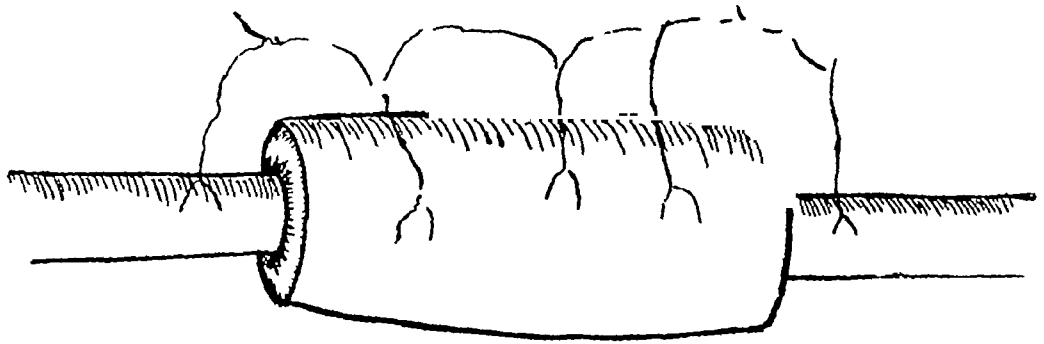
On examination of the abdomen nothing abnormal was to be noted except for some tenderness over a small area just a little to the left of the umbilicus, close to the outer margin of the left rectus. A small intra-abdominal lump about the size of a betel-nut was palpated in the region where tenderness was complained of. The lump slipped under the examining fingers and was definitely tender. A tentative diagnosis of an enlarged mesenteric gland was made.

The patient was given a note for admission to the K E M Hospital. He was examined there again on 8—8—1940 and the lump was demonstrated to the students in the Out-patients' department.

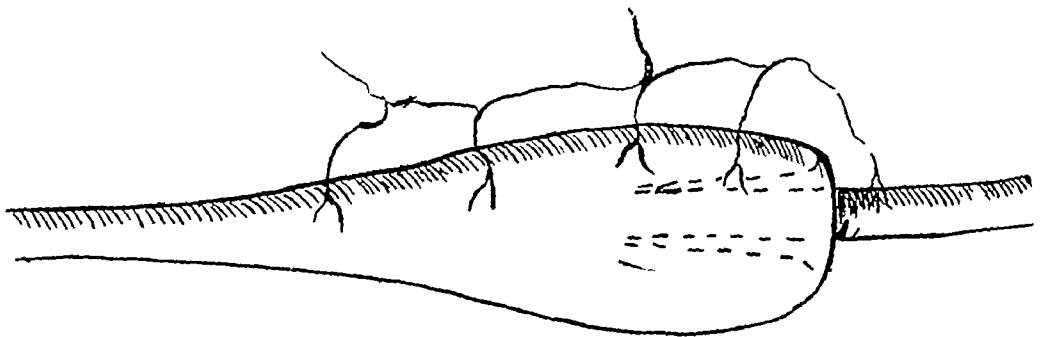
On the afternoon of 9—8—1940 he was examined again. There was still tenderness in the same area but the lump was not palpable. Stool examination was completely negative. He was put up for an exploratory laparotomy on the following day with the provisional diagnosis of a Tuberculous lesion of the abdomen. Spinal anaesthesia was administered. An attempt to feel the lump failed again.

Abdomen was opened by a left para-median incision. The coils of intestine as they presented themselves appeared to be normal. A hand was passed under the transverse-colon and the meso-colon and a small lump was felt. The lump was pulled out and showed itself to be an intussusception about $4\frac{1}{2}$ " in length in the upper coils of the ileum. The involved portion of the intestine did not show the usual sausage shaped curvature and the walls did not show any vascular changes except for a slight dusky discoloration.

The appearance presented was that of a cricket-bail and is illustrated in a sketch below —



Very slight traction on the gut in the right hand caused the intussusceptum to correct itself leaving an appearance as shown in the Sketch (2)



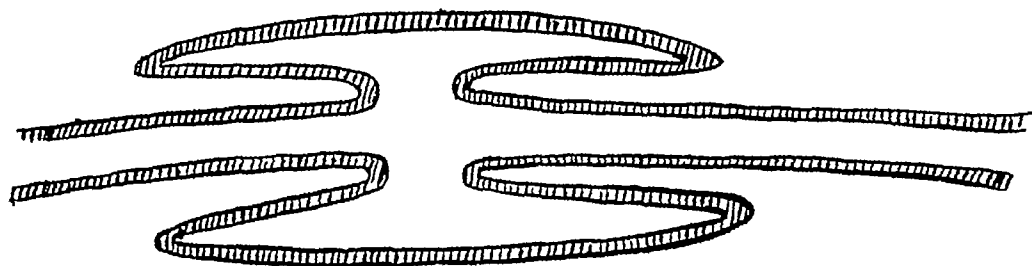
Thus what was reduced was only the half of the intussusception, *viz*, the proximal part that had got invaginated into the distal part

Now what remained was the intussusception of the distal portion into the proximal part. Very slight traction reduced this invagination as well and the intestine appeared to be quite normal. The involved portion appeared to be oedematous and somewhat dilated for a total length of about 9" but was quite soft and pliable. The serous coat was normal. Very careful palpation of the involved area of the gut failed to show the presence of any polyp, etc. The intestine was therefore not opened.

One C C of Pitressin was injected and the affected portion of the bowel was kept under observation.

In the meanwhile appendicectomy was done. Fairly vigorous peristaltic waves were seen but there was no recurrence of the intussuscep-

tion The abdomen was closed When reconstructed the intussusception may be presented as in Sketch (3)



The patient stated on subsequent days that the pain from which he had so constantly suffered had disappeared completely

He was discharged on 20—8—1940 Just before his discharge he stated that he had pain again in the abdomen Careful palpation failed to show any lump He was instructed to present himself from time to time

He presented himself on 28—3—1941 He was free from all symptoms

The case presents some interesting features It is published in the hope that criticism may be offered by other surgeons on the following points —

- (1) As the pain was constant for $1\frac{1}{2}$ years, is it justifiable to presume that the intussusception was of the same duration ?
- (2) The absence of adhesions and vascular changes indicate an intussusception of recent origin
- (3) The combination of an invagination of the proximal part of the bowel into the distal, with a symmetrically opposed invagination of the distal portion into the proximal is quite unique

The restoration of the lumen was so complete that it is possible for one to presume that the intussusception could not have persisted for the full period of one and a half-years

Since meeting with this case it has been the good fortune of the writer to meet with another case of an intussusception of the small intestine where vascular changes were again absent These two cases open up a line of thought on the Aetiology of intussusception This problem is at present under investigation

HAEMORRHAGIC CHOLECYSTITIS

BY

A. T. ANDREASEN, CAPTAIN, I M S ,
PRINCIPAL, AND LECTURER IN CLINICAL SURGERY,
ORISSA MEDICAL SCHOOL, CUTTACK

An Indian village woman, said to be 60 years of age, very old and withered, was admitted to hospital on January, 14th, 1940, complaining of acute abdominal pain of two days' duration

Her history was that whilst lying down during the heat of the day, on the 11th January, she was seized with very acute pain in the pit of the stomach just under the lower end of the sternum. Immediately after she vomited copiously and had continued to vomit ever since, at intervals of about 3 or 4 hours. The feeling of nausea had never left her. The early vomit contained food, but has since been bile stained, with mucus and a little blood in it this morning (14th January). The bowels had not acted since the pain began, but much gas was belched up.

The pain, at first constant and agonising, causing her to lay rigid and cry out, had now become less acute, at first confined to the Epigastrium, it spread later down the right side of the Right Loin and Right Iliac fossa. To-day, there has been pain at the Right shoulder, vaguely localised along the clavicle on the Right side.

Urine had been voided normally and without pain and was said to be of normal colour.

Previous History—Eight children alive, cannot remember how many still-births or miscarriages she has had. Gives a vague history of dyspepsia for many years. This had, however, been much less of late.

Examination—14-1-1940—A very ill, wrinkled, dehydrated, old lady of the type living in the jungle villages of Orissa. Mucous membranes very pale. Answers questions well, in fact very talkative. Temperature 99.8°F. Pulse 95, small, and easily compressible. Respiration 30. Lower costal margins and upper abdomen do not move well, particularly in the centre and to the Right side. Heart Sounds soft, otherwise (clinically) no detectable abnormality. Blood Pressure 95/75. Lungs Normal, but for some old Bronchitis. Abdomen Epigastrium and Right Hypochondrium, Right flank and Right Iliac fossa do not move on respiration. The remainder moves fairly freely.

The Right Hypochondrium and Epigastrium are flattened, the rest of the Abdomen appears slightly ballooned.

On palpation the upper right quadrant is rigid. This rigidity decreases in degree from above down until the lower limits of the Right Iliac fossa are reached where it is only slight.

The abdomen is soft elsewhere and admits of the palpating hand being pressed in deeply. The whole of the rigid area is Hyperaesthetic to a pin being drawn over the surface and also to pinching up the abdominal wall between finger and thumb, maximum in the Right Hypochondrium.

Percussion reveals a dull area continuous with the normal liver dullness, extending from the right costal margin, over the right flank and up to the mid-line above the umbilicus. The right iliac fossa is less dull, the remainder of the abdomen is very markedly tympanitic. There is no shifting dullness. Auscultation revealed a silent right half of the abdomen. Normal or fairly normal peristaltic noises could be made out on the left.

P R—Rectum empty and slightly ballooned. No tenderness located in Douglas' Pouch. Uterus felt as a small hard mass in normal position. Ovaries not palpable. Tubes not palpable.

Perineum—Old tear, with small cystocele and rectocele.

Extremities—Normal. Pulsation equal on both sides and present in both limbs (upper and lower pairs).

Urine—Sp gr 1020. Acid, Albumin a slight cloud.

Sugar, Green (Benedict), Acetone present (to Rothera's test).

Diagnosis—Right Hypochondrium Peritonitis, probably due to acute Cholecystitis. There was a possibility of perforated duodenal ulcer. (Duodenal ulcer as part of a diet Deficiency Syndrome is common amongst males and females of Orissa).

With this possibility in view Laparotomy was decided upon.

Operation—Under General Ether, and Local Novacain anaesthesia the abdomen was opened by a Right Paramedian incision, placed above the level of the umbilicus. There was no free gas on opening the Peritoneal cavity. A small quantity of pink tinged clear fluid appeared free in the Peritoneal cavity. There was no ulcer or perforation of the stomach. The Duodenum showed no lesion. The appendix was normal. Retraction of the liver edge revealed a large turgid Gall bladder with dark brown black coloured contents shining through the distended wall. There was no point of gangrene to be found, but the organ possessed a distinct mesentery which was equally dark coloured and thickened. There was no sign of torsion. A large needle attached to a syringe drew out what appeared to be dark blood, odourless and not purulent. After emptying the Gall Bladder, the organ, with the cystic and common ducts, was explored for stone or new

growth without revealing any abnormality The colour of the organ after withdrawing the fluid, was grey-brown The walls were very thin, and atrophic

An easy Cholecystectomy was performed, thanks to the mesentery present

Drains were placed down to the Cystic duct and the lesser Omental sac

Post-Operative history—was uneventful The patient returned home on the 21st day, quite recovered The fluid proved to be free from bile and sterile, full of R B C and fibrin It clotted shortly after removal

This appears to be a case of Haemorrhagic Cholecystitis There would appear to be no particular sign by which the condition might be distinguished from Acute cholecystitis clinically The etiology is very obscure in this case, there being no history of Trauma, no stone present or history of stone, no new growth present, and to all intents and purposes considering the patient's age, a fairly normal Gall Bladder Torsion might have occurred, but probably not, since the Gall Bladder wall was not stained with suffused blood

It is possible that rupture due to friability of a small vessel in the wall, from age changes in the vessel wall, under an atrophic mucous membrane might easily cause the Gall Bladder to fill with blood Violent infection could undoubtedly cause the condition but would be accompanied by more fulminant signs than those in this case, and the fluid withdrawn would have been heavily infected, the walls of the organ oedematous and inflamed

The rigidity progressing down the Right Flank and Iliac fossa appears to have been due to the gravitation of the slightly sanguinous fluid down Morrison's Gutter Rigidity cleared rapidly after operation, the abdomen soft 12 hours after completion of the Cholecystectomy

The condition is of interest since it is not mentioned in the most reputable Surgical Pathology Texts at present commonly consulted

A CASE OF CONGENITAL PYLORIC STENOSIS

BY

DR S P SRIVASTAVA, M B, M S (LKO), F R C S (ENG)

Patient named Asok Kumar Mathews S/O Mr W H Mathews, aged 4 weeks was brought on 26-4-40 with the complaint of vomiting after every feed for the last 12 days. He had severe constipation and was losing weight gradually.

On examination there was nothing abnormal found in the baby except that it was very peevish and was crying of hunger. It took the feeds but used to vomit out forcibly, whatever went inside its stomach.

After the feeds visible peristalsis used to appear in the epigastric region and the outline of the stomach could easily be traced.

The diagnosis of CONGENITAL PYLORIC OBSTRUCTION was clear. On abdominal palpation the hard mass of hypertrophied pylorus could not be felt as is usual in about 80% of cases.

Treatment—Stomach was washed with saline the previous evening and again next morning. Four ounces of isotonic saline with 2% glucose were given subcutaneously in both the axillary and pectoral regions. Open ether was given as a general anaesthetic. Abdomen was opened in the midline, the incision being about 2" long. The pylorus was brought out and it appeared as hard as a stone. It was caught between the fingers and an incision was made in the superficial layers of the muscle by means of a blunt dissector up to the depth till the mucous membrane bulged out. The muscle was cut right from the pyloric antrum up to the beginning of the duodenum. The abdominal wall was sutured. Tension sutures were removed on the 7th day and other stitches on the 14th day.

Post-Operative Treatment—After an hour of the operation glucose water feeds were started—one dram being given every hour. Rectal saline with glucose was given and two ounces of isotonic saline with glucose were given subcutaneously in the back in the evening.

The patient got hyperpyrexia at night but the temperature came to normal next morning. Except for the post-anaesthetic vomiting once or twice the patient took the feeds and retained them. It gradually began to put on weight. Breast feeding was started the next day, feeds were given for 2 minutes every 2 hours and gradually the feeding time and interval was increased. After a week the baby had increased in weight by 2 pounds. Adhesive plaster strapping was applied all along over the sutures binding the abdominal wall on both sides.

Discussion—The disease is more common in males than females 50% of those affected are first born, breast fed children In this case it was the sixth child Etiology is unknown but there are two principal views (1) Pyloric Hypertrophy is due to spasm and (2) there is a primary Hyperplasia of the muscle and the spasm supervenes on it

The characteristic feature is the pyloric tumour which is produced by an abnormal overgrowth of the circular muscle The tumour was not palpable in this case from outside

The maximum degree of thickening is just proximal to the pyloric opening The muscular hypertrophy decreases as it is traced upwards along the stomach wall It ends abruptly below when the sphincter bulges into the duodenum forming a fornix, which may inadvertently be opened in the performance of RAMMSTEDT'S OPERATION

Symptoms are very typical and the disease, unless it be kept in mind, may be missed altogether, as is usual

Vomiting after every one or every other feed is always present At first it is of the nature of regurgitation which becomes more pronounced Loss of weight continues It is associated with constipation, which is never present in Gastro-enteritis This is common in infants

Estimation of blood chlorides and plasma bicarbonates will reveal the former to be well below normal while the latter will be in excess The recognition of this fact has had an important bearing on the pre-operative treatment and has done much to lower the mortality

Diagnosis is made by the typical history described above and the presence of visible peristalsis after a feed with occasional ballooning of the stomach in the epigastric region It was this which confirmed our diagnosis of the disease Rammstedt Operation is the operation of choice

Medical treatment by dieting and gastric lavage is reserved for doubtful cases and for the very few and exceptional instances in which there is rapid and successful response to medical measures

Factors which have lowered the death rate—(1) The general recognition of the fact that early operation is the treatment of choice

(2) Careful intensive routine pre-operative treatment This includes (a) Regular stomach washing with sterile saline solution The final irrigation of the stomach is performed shortly before the child is taken to the operating theatre As the contents of the stomach are fluid, a Ryle's tube should be used for aspirating the stomach contents and for the irrigations Under no condition should Sodium Bicarbonate be employed for washing out the stomach or for rectal or subcutaneous infusions, as it increases alkalosis (b) Subcutaneous Salines During the last 12 hours before operation

is performed, 10—12 ozs of normal saline should be injected. The saline should be run very slowly into the pectoral region and groins until small tumours form. It is important to see that the injected fluid is not too hot and that the tumours are not rendered too tense otherwise sloughing of the skin or the subcutaneous tissue may result. Glucose 2% may be added to the infusions. (c) Small frequent fluid feeds up to 2 hours before operation.

(3) The maintenance of the child's body heat before, during and after the operation.

(4) The choice of anaesthetic is gas and oxygen with a little ether, or LOCAL in desperate cases. Open ether may also be used.

(5) The universal acceptance of Rammstedt's Operation.

(6) A well-planned scheme of post-operative treatment. After operations these patients are handed over as a routine to the physician for dieting, etc. as operation is only an incident although a very important one in their treatment.

Post-Operative Complications—These may be briefly summarised as follows —

- (1) Hyperpyrexia
 - (2) Inanition
 - (3) Vomiting
 - (4) Diarrhoea—mostly due to infection transmitted through artificial feeds
 - (5) Sepsis of the wound and burst abdomen
 - (6) Chest complications
-

Visits to Clinics

UNITED STATES OF AMERICA

BY

LT-COL K G PANDALAI, F R C S, I M S (RETD)

Boston—One of the oldest centres of medical learning in America, bearing its own distinctive mark of dignified erudition is situate in the city of Boston on the north-east coast of the United States. In population Boston is no larger than the city of Madras, but it has within its limits some of the most famous institutions in the country. The Harvard University which for generations has attracted numbers of our youths in the pursuit of higher learning is here. Within a short distance is the famous Massachusetts General Hospital, a large county Hospital with over 1,000 beds, employing a staff of nearly 2,000 persons of all grades. This Hospital was in the process of reconstruction at the time of my visit in 1938, but I was able to inspect the historic "Ether Dome" in which the first operation under Ether Anaesthesia was performed on October 16, 1846 by Dr Warren, the anaesthetic being administered by Dr T G Morton.

(It may be mentioned that Ether was actually first used in 1842 for Anaesthesia by Dr Long of Georgia who, however, reported his work some years after Dr Morton had published his paper in 1846.)

The original operation table of wood as well as the old Instruments used by Dr Warren are still there and the gallery where students and visitors have sat for nearly a century is still in use as a Lecture Hall.

To a medical visitor from the East, perhaps an institution which has very great fascination is the Peter Bent Brigham Hospital, of 250 beds, where the pioneer Neuro-Surgeon, Harvey Cushing made himself and America famous by his epoch-making advances in the Surgery of the Brain. Unfortunately at the time of my visit he had retired from this Hospital some years before but was continuing his activities as a Professor at the Yale University, New Haven.

While in Boston I had the great good fortune to make personal contact with one of the Master Surgeons of America, in the person of Dr Frank Lahey. His is a small slim figure, age about 60, but his energy is phenomenal. He works harder than most younger men in their forties and seemed to be at the height of his powers. He works at the Baptist Hospital where a special block containing beds, operation theatres and X-Ray Outfit has been erected in his honour by his numerous friends and admirers. Here he

works day after day in his characteristic way spreading knowledge and enthusiasm among all he meets His painstaking thoroughness in every detail of technique is an inspiration to all

Not far from the Hospital is Dr Lahey's private Clinic in which a large number of specialists in the various branches of Surgery collaborate I visited the Clinic and saw there what appeared to be a replica of the Mayo Clinic in Rochester and the Crile Clinic in Cleveland In Lahey, America has one of the keenest minds and most forceful teachers the world has ever produced The 'Clinic' system is peculiarly American and indicates a high degree of specialisation and co-operative effort in Medical practice for the good of the sick public When it is remembered that the system exists not only for the well-to-do but also for the poor, its advantages for a highly individualistic society like ours in India are self-evident

The Deaconess Hospital is another medium sized institution in Boston which I visited Particularly interesting was the work carried on here in Brain Surgery by Drs Horrax and Poppen, former Assistants of Dr Cushing Dr Horrax is the senior and a Surgeon more modest and thorough it is difficult to find Dr Poppen is the younger man and has many qualities complimentary to the other, so that the pair at work are one of the most efficient teams in Neuro-Surgery you could ever get I had the good fortune to see them at work one morning They were operating on a case of Frontal lobe tumour and at the end of a two hour sitting, more than half of the left frontal lobe had been removed, the lateral ventricle was freely open, the field was dry and many haemostatic silver clips had been left in the brain The closure of the wound was thorough and at the end the patient's condition was remarkably good I was informed that the after history of these cases is generally free from anxiety and except for the inherent nature of the disease (malignant) there is no feature of the treatment that presents unusual difficulties at the present time

Thus ended a short and crowded holiday in one of the most select centres of surgical teaching in America and I left with a feeling that when I should get another opportunity this place should be visited again

Philadelphia—Known as the city of Quakers, this is the 3rd largest city in the States and has a population of over 2 million. Industrially it has attained great progress and in Medical advance its claim to fame dates back at least half a century One of the famous institutions of this city is the University Hospital where (Dr Frank Grant) one of the Associates of the late Harvey Cushing carries on Neuro-Surgery of the highest order This is an old Hospital and bears the impress of age I sat in the gallery and watched him operate on a case of Trigeminal Neuralgia The patient was fixed in the upright position Ether anaesthesia was employed supplemented by local infiltration The Hutchinson operation was preferred, the lower

2/3 of the Gasserian Ganglion was removed and a rapid frozen section demonstrated a fibro-adenoma of the root of the 2nd Division of the 5th Nerve

The X-Ray department of this as well as a number of other Hospitals I visited was in the basement Dr Prendergast, an authority in the subject was in charge and kindly took me round in the semi-darkness that prevailed everywhere and I felt greatly interested in a specially built table for Fluoroscopic by the use of which any part of the body could be screened and X-rayed without moving the patient

I also visited the Temple University Hospital which is situated almost at the periphery of this large and populous city and owns a new and brightly arranged building of the modern type There are many eminent Surgeons working in the various departments but I was particularly interested in the Endoscopic Clinic of Dr Chevalier Jackson The founder, Dr Jackson senior, does not now operate but his able son is carrying on the work The remarkable ease with which Bronchoscopy and Oesophagoscopy are done daily on persons of all ages and both sexes was strikingly demonstrated and I watched more than a dozen cases being brought in and examined in rapid succession On an average 20 to 30 cases are examined, foreign bodies extracted, tissues removed for biopsy and other treatment given of an afternoon

Local anaesthesia with Cocaine or Planocaine is employed, Dr Jackson uses his own specially thin bronchoscope, is quick and deft with his fingers, his single male Assistant and Nurse are so well trained that there is hardly any hitch at any stage He must have done many thousands of cases by now and does not take more than a minute or so for individual cases To observe the order and silence of the theatre and ante-rooms, while dozens of cases of men, women and children, all in their senses, daily allow instruments to be passed down their throats and after examination or treatment get up and walk away smiling was a revelation in theatre organization, psychological study of the sick and surgical dexterity of a highly specialized order In the course of an afternoon spent in this fruitful fashion, I happened to wander into one of the adjoining rooms where I saw a comparatively young Surgeon operating on cases of deflected Nasal septa He had 3 patients sitting in cubicles waiting for their turn, while one was being operated on under local anaesthesia Very few instruments were there, he had no assistant at his elbow, the hammer and chisel were freely used and the patient said very little although he showed obvious signs of discomfort at what was going on The American patient is stolid and does not easily give way to panic I was informed later that this particular Surgeon does practically nothing but septum operations The width of his experience and his dexterity could, therefore, be imagined

While in Philadelphia I had further opportunities of watching Dr Frank Grant perform his operations on the Brain On another morning he was engaged in removing a cerebellar tumour from a boy of 14 It was a Medullo-blastoma growing from the roof of the 4th ventricle Intra-tracheal Gas Oxygen was employed, the patient was on his face on the table, the operation was long and took 3 hours, the growth was vascular and was removed piecemeal and at the end a dry and clean field showing the floor of the 4th ventricle was demonstrated At one stage the patient's condition gave cause for anxiety but with blood transfusion, his pulse and respiration became steady and he left the table in an excellent state

Philadelphia has a number of other large Hospitals where teaching of medical students is carried on The Pennsylvania General Hospital with over 3,000 beds, the Presbyterian Hospital of 300 beds, and the Jewish Hospital, a small but well-equipped institution are all devoted to teaching under the Temple University which has nearly 400 students on its rolls

Cleveland—There are few Surgeons who have not heard of and benefited by the researches of Dr George Crile one of the pioneer Surgeons of America His is a unique personality and for simplicity of character, great earnestness and enthusiasm in his work, I do not think he has been excelled anywhere in the world He was not a young man when I visited him, was 75 in 1938 but was active and buoyant and carried on his work of guiding his Clinic, which he built up after his retirement from ordinary work at the usual age of 60 For over a generation Crile's fame as a Goitre Surgeon has been world-wide and his work in connection with Surgical shock is an epic of surgery Age, however, has not damped his ardour and in his organization, after retirement, of the Crile Clinic, which in his modesty he prefers to call the "Cleveland Clinic," he has rendered to Surgery a service which will remain a shining example to generations of Surgeons in the years to come

When I arrived at Cleveland, I had the usual feeling of a stranger in a large city but very soon the friendly Hospitality of my hotel had made me feel at home Within a few minutes of my seeing Dr Crile, he had made me feel that I was among old friends, so cordial and intimate is the atmosphere prevailing everywhere in Cleveland Dr Crile himself took me round his Clinic, which was a large place occupying four floors Although long past the age when we tropical inhabitants are accustomed to lay down our weapons and retire from work, he seemed to enjoy his working day which I calculated could not be less than 16 hours daily He taught, operated and guided others' clinical and laboratory work and was never too tired to attend to calls even from far away towns He liked to meet visitors and enjoyed their conversation He took me round his Institute, explained to me the working of the various sections including Research, X-Ray Institute, animal experiments, etc which he had carefully built up The Section

which was most interesting of all was the Museum. Here were life size illuminated specimens of almost all the known mammals in creation and near each were shown its Brain, Thyroid gland, Adrenals and Coeliac ganglion in natural size. From the lowest to the highest animal, these specimens showed the evolution of the Brain and other energy-controlling glands. Dr Crile has tried to show that in man these glands have attained their greatest development and that the source or situation of man's tremendous energy is the Coeliac Ganglion (sympathetic) in the abdomen.

His researches into the subject of essential hypertension are well-known and this Museum illustrates the results of his study extending over many years and in the course of which he undertook a flying expedition many years ago into the wilds of Central Africa to study the animals in their natural surroundings. He has with his own hands dissected these wild animals in the jungles of Central Africa where he had taken with him a Laboratory for this purpose and the results of his study were later published after his return from the expedition in a book entitled "Skyways to a Jungle Laboratory."

I was given the privilege of watching Dr Crile perform his operation for Hypertension on a number of his patients. The incision in the loin is a curved one, base towards the midline, with its centre about 2" below the last rib, he then deepens the incision and dividing the muscles in the centre puts in 2 fingers with which he feels for the origin of the Renal artery. Then guided by the fingers he injects 20 c c of 1 per cent Novocaine solution into the vicinity of the ganglion and introduces his special dissector, a long stout probe with flattened ends, about 18" long, with whose aid the semilunar ganglion is dissected free from its attachments. A certain amount of bleeding occurs but of this no notice is taken. A remarkable fact is that while the ganglion is being manipulated a marked fall in the blood pressure usually occurs sometimes as much as 100°, the pressure gradually rising to normal shortly after the operation. The operation on the opposite side is done 10 days later. The mortality of this operation is very low (25%) and the results are good and permanent in about 50% of cases.

It is the custom in this Clinic to do their Thyroid operations on the patients' own bed and the various refinements of technique by which the gland is 'stolen' from the patient without his or her being aware of when and how, thereby preventing much anxiety and shock, were developed and are in daily use in Dr Crile's Clinic. The ease with which these details are carried out here seems very striking and shows what industry and practice can accomplish in attaining technical perfection.

Through the courtesy of friends in India, I had the opportunity of making a number of social contacts with people of the well-to-do grades of society in Cleveland. Their hospitality to strangers was a refreshing experi-

ence and we saw how middle class people having business in the city relax themselves in the evening by retiring to their country homes some miles out of the city. The country round is undulating and large estates are the rule. Fruit trees grow in abundance and large fields of corn or grass lend a pleasing aspect to the view. Flower beds and lawn are cultivated everywhere and the people seemed to prefer the old style of country houses, rather than the modern type of structure which one now sees in most cities. At a Dinner party where we were guests, we were seated on long benches without backs at a large low table and were attended to by a coloured lady who both cooked and served the dinner, which we must testify was a most sumptuous fare and in the large low roofed hall where we sat later was a huge fire blazing in the fire place, lending a most soothing effect to our conversation but it was July and the room soon became so hot that windows had to be opened. The memories of such occasions are not easily effaced and beside much stimulating surgical advance that I witnessed, the kindness of soul which makes human contacts so pleasant was there in fullest measure in the city of Cleveland.

Cleveland has other large Hospitals, of which the largest is the Lakeside University Hospital. The Surgical Unit here is presided over by Dr. Lenhart, the Senior Surgeon who kindly took me round. The department had been recently reconstructed, the wards and equipment were of the best and there prevailed everywhere an atmosphere of homely comfort which appears to be the aim of the modern designer of Hospital wards in America. Blank white walls are not popular and one sees everywhere a little colour added to the paint on the wall and pictures of natural scenery add variety to the outlook.

Association Notes

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The Third Annual Conference was held at Delhi in April 1941. A full report of the proceedings is being published separately.

The next Conference is to be held at Calcutta in October 1941. The subjects for discussion are —

1. Surgical treatment of Pulmonary Tuberculosis
2. Surgical Aspects of Filariasis
3. Traumatic Surgery of the Knee Joint

The following are the subjects for discussion in the next three years —

- | | | |
|------|---|------------------------------------|
| 1942 | 1 | Laryngeal Carcinoma |
| | 2 | Injuries of the Thorax. |
| | 3 | Surgery of Thyrotoxicosis |
| 1943 | 1 | Traumatic Surgery of the Skull |
| | 2 | Carcinoma of the Breast |
| | 3 | Urinary Lithiasis |
| 1944 | 1 | Carcinoma of the Rectum |
| | 2 | Enlarged Prostate |
| | 3 | Fractures of the neck of the Femur |

* * * * *

Foundation members who have not yet sent in their photographs for the Album are requested to do so at an early date.

* * * * *

Attention is drawn to the notice regarding the Prize essay published in this issue.

Association of Surgeons of India

PRIZE ESSAY ON "INFECTIONS OF THE FOOT"

The Association of Surgeons of India offers an annual prize of the value of Rs 150 to the best essay based on original work on a subject to be decided by the Governing Body of the Association and announced every year

The following are the conditions of the award —

1 The competition is open to all qualified medical practitioners registered in India, who have been in practice for not more than 10 years after qualification

2 The essay should be based on original work and should be written in English

3 It should be type-written on one side of the paper only and should not contain the name or other indication of the identity of the competitor Four copies should be submitted

4 The name, address and qualifications, however, should be written on a separate sheet of paper and enclosed with the essay

5 The subject for 1942 is "**Infections of the Foot**" and the essay should reach the Secretary before the 1st October 1942

6 The copyright for the winning essay will remain with the Association of Surgeons of India and will be published in the Indian Journal of Surgery Other essays will be returned to the senders if accompanied by stamped addressed envelopes

7 The Governing Body may at its discretion withhold the prize if the essays submitted do not come up to the standard

8 All communications regarding the above are to be addressed to the Secretary, Association of Surgeons of India, Binfield, Kilpauk, Madras

C P V MENON,

Hony Secretary

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NOTICE TO CONTRIBUTORS

All contributions to be sent to the Joint Editors, The Indian Journal of Surgery, 'Belle Ville,' Gowalia Tank Road, Bombay and 'Laud Mansion,' Queen's Road, Bombay or to the Editorial Secretary, 'Dreamland,' 25, New Queen's Road, Bombay 4

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वेदनोपशान्तिः पाण्डुताऽल्पशोफता वह्निप्रादुर्भावस्त्वक्परि-
पुटनं निम्नदर्शनमङ्गुल्याऽवपीडिते प्रत्युन्नमनं, बस्ताविवोदकसंचरणं
पूथस्य प्रपीडयत्येकमन्तमन्ते चावपीडिते, मुहुर्मुहुस्तोदः कण्डूरुन्नतता
व्याधेरुपद्रवशान्तिर्भक्ताभिकाङ्क्षा च पक्कलिङ्गम् । कफजेषु तु रोगेषु
गम्भीरगतित्वादभिधातजेषु वा केषु चिदसमस्तं पक्कलक्षणं दृष्ट्वा
पक्कमपक्कमिति मन्यमानो भिषज्जोहमुपैति; तत्र हि त्वक् सवर्णता
शीतशोफता स्थैर्यमल्परुजताऽश्मवच्च घनता, न मोहमुपेयादिति ॥ ५ ॥

सुश्रुत व्याख्याया सूत्रस्थाने सप्तदशोऽध्याय ॥

Lessening of pain, paleness, diminished swelling, the appearance of wrinkles, peeling of the skin, appearance of a depression on pressure by a finger and its disappearance after removal of the pressure, on pressure there is movement of the pus from one end to the other lifting up the other end as in a bladder full of water, often there is pricking pain, itching and a raised swelling. The violence of the disease diminishes and there is desire for food, all these are signs that the inflammation has ripened. Having seen all the signs in inflammations arising from disturbance of the Phlegm, and in those that are deep seated or are result of an injury or blow and in some others the Physician cannot make up his mind whether the inflammation has ripened or not, under such circumstances noting that the skin is of the same colour (as the surrounding), the colours and fixity of the swelling, the small amount of pain and the almost stony hardness will help the physician to come to a decision.

—SUSHRUTA SAMHITA, SUTRASTHĀNA,
Seventeenth Chapter, V Verse

EDITORIAL

An interesting paper appearing in this issue from the pen of Capt Andreason relates to the operation of Drainage of the Thoracic Duct in cases of Experimental Intestinal strangulation. For many years it has been known that in a few hours after the occurrence of total occlusion of the Gut including its vessels of supply in what is known clinically as Intestinal Obstruction, a very toxic material is poured not only into the lumen of the obstructed loop but also into the segments proximal to the block, and the longer the interval before relief is given to the obstruction, the more virulent this material becomes and progressively greater the intoxication of the circulatory system, so much so that even if the obstruction is removed in the advanced or late stage, the condition of the patient does not improve, the gut does not regain its peristaltic activity in spite of resection of a non-viable segment and death follows rapidly.

It had been suggested that this intoxication is due to absorption of virulent Toxins by the Lymphatics of the bowels in and near the affected segment and discharge of the same into the circulation by the Thoracic Duct and attempts have been made, on this hypothesis, to prevent the continuous entry of such Toxins into the blood by drainage of the Thoracic duct in the neck. Surgical literature of about twenty years ago used to contain reports of several such attempts by Surgeons all over the world in cases of Intestinal Obstruction as well as Acute General Peritonitis. The writer himself could recollect 3 such cases in his own practice in which drainage of the Thoracic duct under local anaesthesia could not save the patients' lives in General Peritonitis and he well remembers the disappointment following the failure of what was at the time a novel and rational procedure in these desperate cases.

The article by Andreassen appearing in this issue affords further testimony based on experiments on cats to the inutility of the method of Thoracic Duct drainage in Intestinal strangulation and should serve to stimulate interest in further research for the amelioration of the condition, besides arousing our surgical conscience to the need for constant vigilance when face to face with a suspicious case of Acute Abdomen, in order that early cases may be given relief by prompt operation without allowing them to pass into the later hopeless stages by a policy of too prolonged watching and waiting.

The paper on the management of cases of Gastric resection by Messrs Cohn & Pool should be of interest to practising surgeons who have to handle numbers of such cases in large hospitals. It is the general experience in this

country to see these cases in the terminal stage, where the patient is so worn out by pain and starvation that nothing short of an immediate resection of the stomach will be of any benefit but they are so run down that an immediate operation would almost certainly prove fatal. Every measure by which these patients could be brought into a state that will withstand operation deserves to be freely employed and the various steps described by the above authors and as carried out in 4 typical cases in the Tata Memorial Hospital at Bombay deserve the serious consideration of Surgeons.

All are agreed that the most important of these life-saving measures is Blood Transfusion, but the difficulty in an institution which deals with numbers of such cases is the old problem of obtaining donors in an emergency and unless a suitable relative is available at hand, the transfusion cannot be administered. It has been difficult to obtain dried plasma in India except for experimental purposes and although now the war has given an impetus to local production, the material is almost unobtainable in the open market.



DR P RAMACHANDRA RAO, M B B S , PH D (LOND),
LATE PROFESSOR OF PATHOLOGY, MEDICAL COLLEGE, MADRAS

*Born on 13th July 1894—Educated in Madras Medical College and
University College, London—Died on 25th August 1941*

Dr P Ramachandra Rao, who died at the early age of 47 was one of our Associate Members. He took a keen interest in the Association and the Indian Journal of Surgery. More than one article from his pen has appeared in this Journal and he was always ready with his help in supplying photomicrographs and pathological notes on cases reported in these pages. He made a special study of Hepatology and his contributions on this subject have appeared in many Medical Journals. He was universally loved and respected by colleagues and students alike. In his death the Association has lost one of its most enthusiastic Supporters and the Profession a Pathologist of eminence.

THORACIC DUCT DRAINAGE IN EXPERIMENTAL INTESTINAL STRANGULATION

BY

A T ANDREASEN, CAPTAIN, I M S , F R C S ,
PRINCIPAL AND LECTURER IN CLINICAL SURGERY,
ORISSA MEDICAL SCHOOL, CUTTACK

Knight and Slome (1935-36) discuss the observed fact that in cases of strangulation performed by venous ligation alone, without interference with the Lymphatics, the Thoracic Duct and Mesenteric Root Glands become filled and stained with a blood-red fluid similar to the Peritoneal cavity fluid in such a case, and having in Non-Viable cases, a depressor effect on the Blood Pressure of a normal animal. In viable cases, according to these workers, the fluid appearing in the Duct is Pressor in effect. They note that dye is rapidly absorbed by the lymphatics from the Peritoneal cavity by the same route.

At the time of the appearance of this work in print, I was conducting experiments to test (a), the nature of this fluid in the Thoracic Duct, seen in Human cases, at Post Mortem, after Intestinal Strangulation, (b), to follow up an idea suggested by the work of Wilms (1910), Fredet (1910), Jounesco (1911), who drained the Duct in various clinical conditions, and by the experimental and clinical work of Costain (1922), and Williamson and Brown (1923), Cox & Bell (1925) and McGuire (1925).

These attempts to use drainage of the Duct as a therapeutic agent, were all made in conditions other than intestinal obstruction or strangulation. The results had been clinically disappointing, and experimentally inconsistent.

In cases of strangulation it appears possible that some powerful Toxic body, or bodies, gain access to the systemic circulation in sufficient quantity to kill,—in conjunction with other factors of deranged Physiology, mostly ill understood and certainly not yet intelligently correlated or evaluated, but similar to the manifestations of the condition now generally called "Secondary shock". These Toxic substances, if they enter *via* the Thoracic Duct, gain immediate access to the systemic circulation and the vital centres, without the protective passage through the defensive barrier of the liver, as is the case with Toxins entering *via* the Portal system. It would seem therefore reasonable to suppose that if this fluid in the Duct were toxic and could be diverted before entry to the Blood stream, then a therapeutic adjuvant to the programme of treatment of a case of Intestinal Strangulation would have been found.

The problems therefore were —

- (a) What is the difference in effect of Normal Thoracic Duct fluid, and Strangulation Thoracic Duct fluid on a constant Physiological (Recording system) preparation, i.e., Blood Pressure of Cat ?
- (b) What is the effect of drainage of the Thoracic Duct on the course and out-come of experimental strangulation ?

These are interdependent problems and therefore discussed in one paper

Experimental methods—Cats were used, selection being made so that all the animals were of white and brown colouring, of 2½ Ks to 3 Ks weight, and of female sex

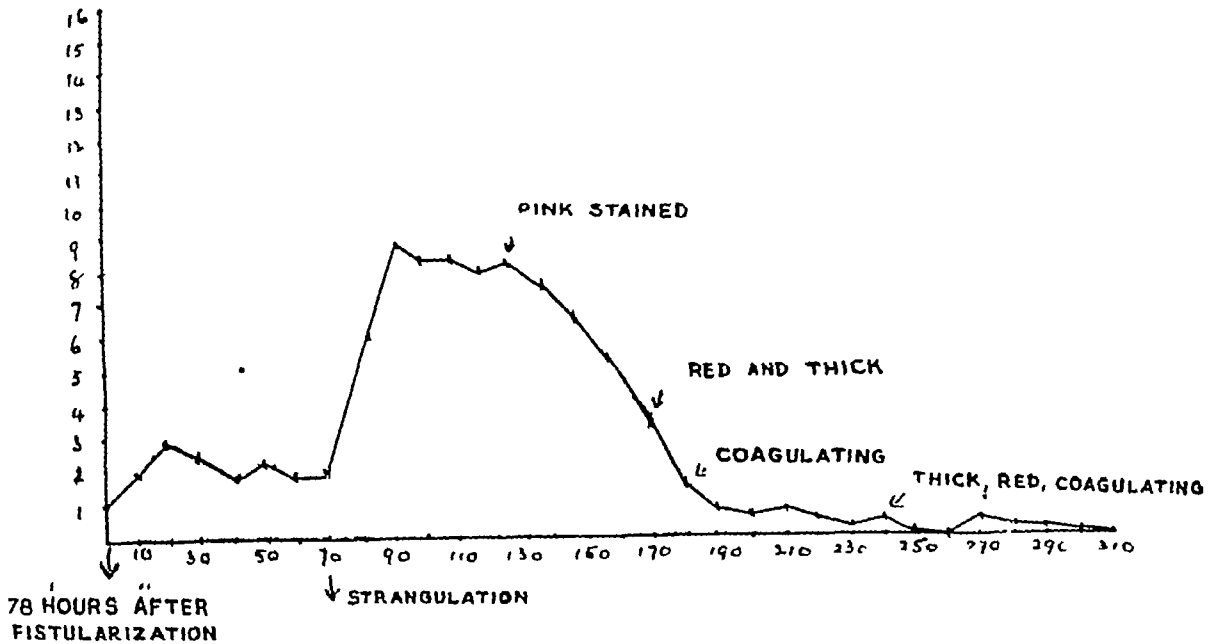
(a) *Thoracic Duct fistulae were prepared by the following technique* —

The selected cats were duly prepared and their necks shaved on the left side. Under open ether anaesthesia an incision was made along the inner side of the External Jugular vein. The vein was dissected down cleanly, tying the small tributaries en route, to the beginning of the Innominate vein. It was found to be easier to clear the vein first on its medial side, then on the lateral side. This lateral dissection exposes the Subclavian vein at the same time. The Subclavian artery and vein, Innominate vein, and the Internal Jugular vein were all tied close to the junction of the veins with the External Jugular. (There may be a common Jugular vein present, in which case ligature of the Internal may or may not be required). The External Jugular is tied last and high up near the Thyroid cartilage. When the vein is tied the Thoracic Duct usually stands out clearly. The vein is sectioned below the ligature and the blood washed out with normal saline. A small stab wound is made at a convenient point in the neck so that the duct and vein drain downwards when the animal stands. A small suture on each side holds the vein in position. A small strand of silkworm gut folded on itself, pushed into the vein opening and caught in one of the sutures serves to keep the wound open until a true fistula is established. The neck wound is closed without drainage.

Using this technique Ten Thoracic Duct fistulae were prepared. In the light of further investigation, to be discussed later on in this paper, it is worth noting that 22 cats were operated on before ten specimens were obtained in which lymph drained freely and continued to drain for more than 48—72 hours.

Fluid came from the Ducts at the average rate of 2.5 c.c. per ten minutes, in the normal fistulised cats. After strangulation fluid flowed more

quickly at first but soon slowed up finally stopping below the normal rate (Fig I)



(Fig I)

Every 12 hours the Thoracic Duct fluid collected was injected (if not clotted) into a leg vein of the animal it came from

The cats, in which the Fistulae remained patent, were subjected to median abdominal section and strangulation of a section of ileum on the fourth day after the establishment of the Thoracic Duct fistulae. Ether was again used as the anaesthetic.

(b) *The Technique of strangulation was as follows —*

Previous to opening the abdomen, three lengths of $\frac{1}{4}$ " tape are measured off — two of 10 cms, and one of 35 cms

The abdomen having been opened by a mid-line incision about the middle of the abdomen, the Ileo-caecal junction is identified. With a tape 10 cm long a point 10 cm up from the Ileo-caecal junction is measured on the ileum. Here the tape is passed through the mesentery just above the vascular loops running close along the intestinal wall. The tape is tied carefully but firmly so that the vessels are occluded and the lumen of the gut, without tearing the intestinal wall. The 35 cm tape now measures 35 cm from this point and gives the site of the next 10 cm tape which is placed and tied as in the first instance. In measuring these lengths of gut, care must be taken not to handle it roughly, causing contraction, not to stretch it, so that a "resting length of 35 cm" may be obtained. With a fine needle and sterile

thread the veins to this length of intestine are all tied off in such a way that no colateral venous drainage exists. In doing this neither Lymphatics nor Arteries are interfered with. The intestine is returned to the abdomen which is closed firmly with silk, in one layer.

As each Thoracic duct preparation was subjected to strangulation a control strangulation preparation was made upon a non-fistularized cat as nearly equal in weight as possible. Actually all the control cats were chosen so that they weighed slightly more than the Fistularized cats.

By previous experiments it had been found that a cat without a fistula, but with a 35 cm strangulation of the type detailed above dies in from 20—26 hours. Apparently the weight of the animal had little to do with the time of survival (see Table I).

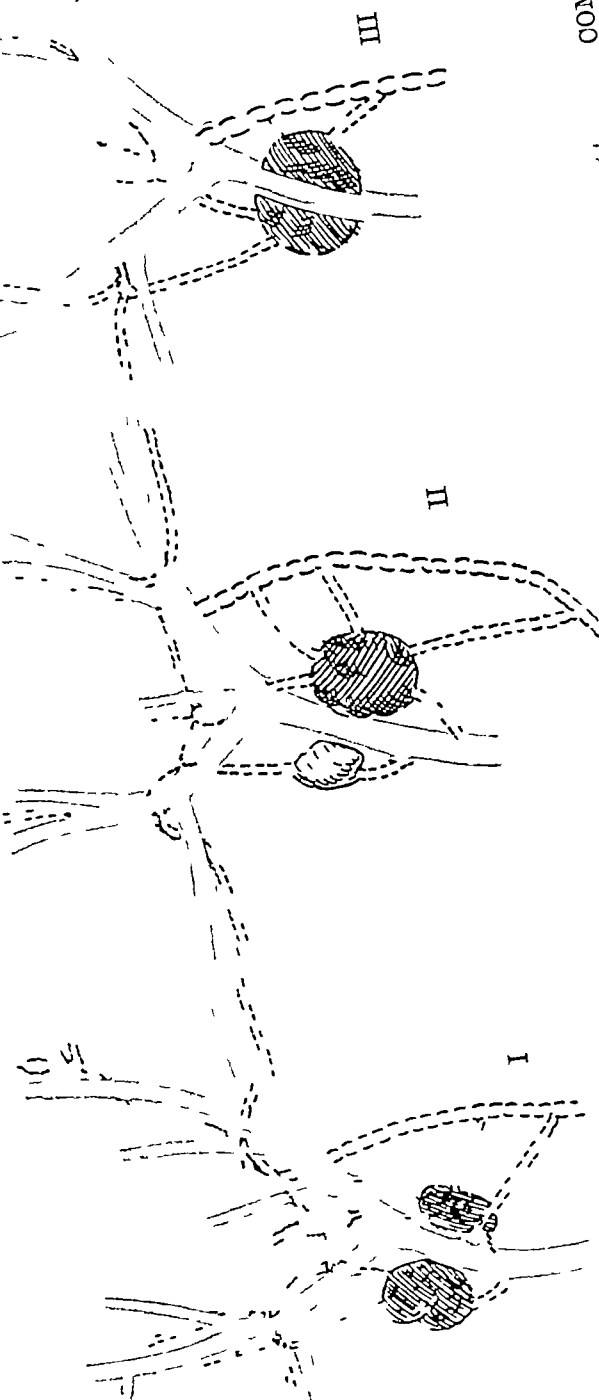
Table I

Cat No	Length of S Cms	Position of S from I C J Cms	Survival Hours	Weight Grammes
41	35	10	21 15/60	2850
42	35	10	25	2900
43	35	10	23 35/60	2608
44	35	10	23 50/60	2591
45	35	10	21	3052
46	35	10	24 10/60	2948
47	35	10	25 40/60	3100
48	35	10	20 20/60	2789
49	35	10	23 15/60	2853
50	35	10	26 10/60	2935

Table II compares the survivals of cats with fistulae with their controls, A=with fistula, B=Control. It will be noted that the control was in many cases selected as slightly heavier than the cat with the fistula.

Table II

A	Cat No	Weight	Survival	B	Cat No.	Weight	Survival
	71	2741	26 40/60		81	2758	22 30/40
	72	3071	25 25/60		82	3090	24 55/60
*	73	2907	22 50/60		83	2912	23 25/60
	74	2583	24 15/60		84	2590	20
	75	2677	27		85	2681	23 40/60
	76	2839	25 45/60		86	2843	21 35/60
*	77	3246	21		87	3251	23 50/60
	78	2989	26 10/60		88	2992	25
*	79	3058	23 55/60		89	3065	24
	80	3005	26 35/60		90	3011	23 10/60



COMMONEST TYPES OF LYMPHATIC TERMINATION IN NECK CATS

NUMBER OF CATS EXAMINED 270

METHOD P.M. after Strangulation

of standard type of lower

Ileum

Parts of Lymphatic system drawn

in Red = coloured by Strangu-

lation fluid

Green = uncoloured by Strangu-

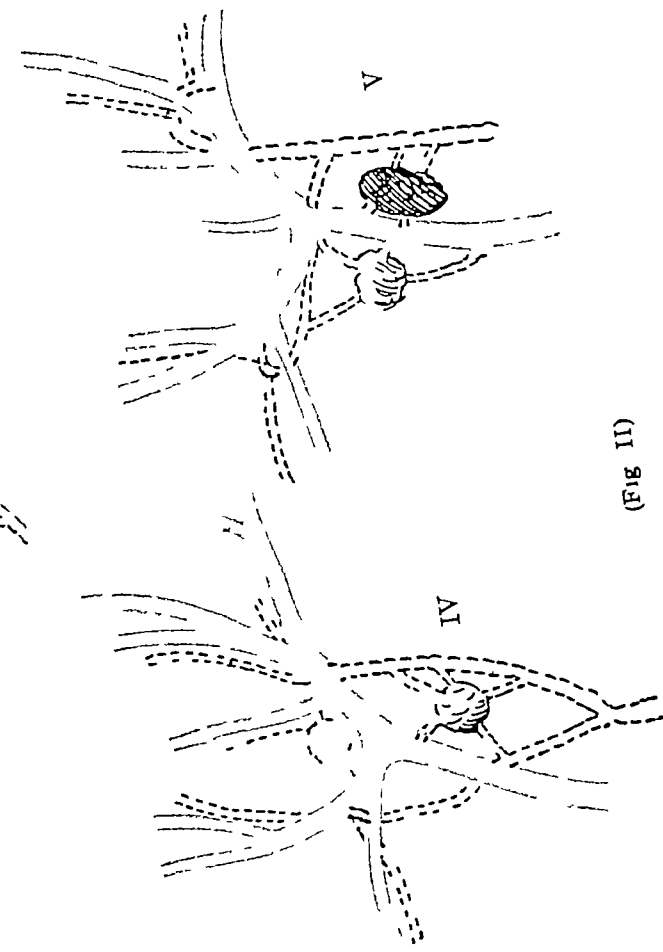
lation fluid and found by

dissection

Blue = Veins

Periods of Investigation 1936-1938

1939-1941



(Fig II)

It will be seen that in general the survival of the fistularized cats was longer by a few hours than that of the controls. There are three exceptions *73|83, *77|87, *79|89. In the first two, the controls survived longer, and in the third the times were so close that the result is useless. Such small differences as were obtained were hardly significant in view of the variation in time of survival of cats shown in Table I with exactly similar strangulations. Much longer periods had been hoped for, and indeed would be necessary for the result to carry any conviction.

It is doubtful if it is safe to draw any conclusion from such an experiment, for there are so many unknown and uncontrolled factors involved. Therefore I leave it, as it stands, recorded.

Interest now arose over the Post mortems of the animals used in all these operations. There were three groups to be considered —

- (a) Those cats in which the fistulae failed to form
- (b) The cats which died in the time suspected they might take to die
- (c) The exceptions *73|83, *77|87, *79|89

It is common knowledge that the lymphatic arrangements of mammalia are very variable and irregular. The formation in Humans is equally irregular [Wylls Andrews (9) and (10) Gerrish (11)]. With this in mind the anatomy of the lymphatics at the termination of the Thoracic duct and in its Thoracic route was investigated in all these cats.

The drawings (Fig II) show the common types found in this series and in all the cats used for experiment since the date of this particular one. The total number of cats investigated up to date is 270. The types occurred as follows

Type I	44 %	
„ II	23 %	4 % so variable as
„ III	16 %	not to be classified
„ IV	8 %	
„ V	5 %	

The point of interest clearly shown in this analysis is that in every type there is drainage occurring on the right side as well as on the left. In some cases, e g, Types IV and V, this is almost equal to that occurring on the left. Next, it is to be noted that in a certain number of cases the main duct enters the Innominate in the Thorax, and would not be drained by the operation performed, such a serious procedure as opening the Thorax for ligature of the Innominate is, of course, beyond the bounds of Therapeutic venture for so doubtful an outcome. Again bilateral drainage would not be rational for

the same reasons In 90% of the cats the Lymphatics accompanying the Int Mammary Arteries were coloured by the strangulation fluid These Lymphatics end chiefly in the right duct, [K Paterson Brown (1928)] Thus it would appear from this anatomical study that drainage of the duct on the left is not likely to influence the outcome of a case very greatly In fact, the experimental results obtained by me would tend to corroborate this anatomical evidence

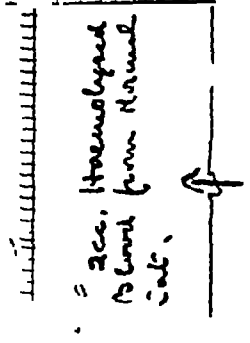
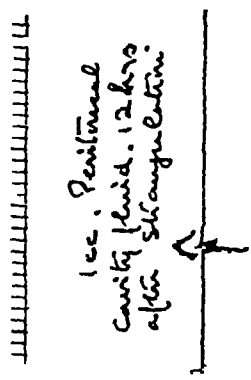
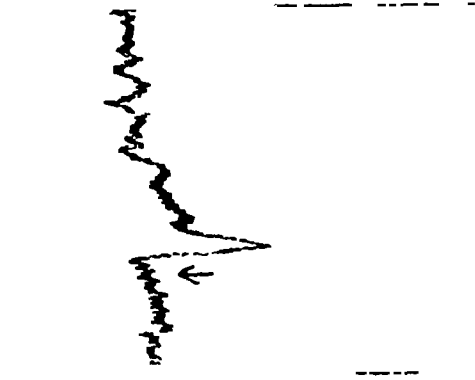
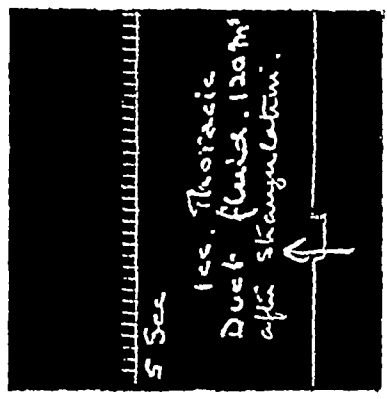
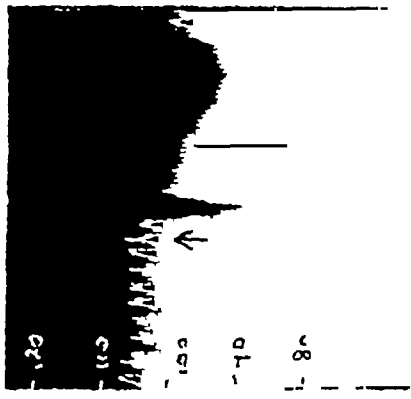
Of the cases in which Fistulae failed to remain patent longer than 48—72 hours, all, except three, showed multiple well marked communications between the right and left ducts The three exceptions were apparently failures for technical reasons All these cats were studied at post mortem after the standard strangulations had been carried out on them All the cases, 71—80 inclusive, *i.e.*, those which had had fistulae made four to five days previous to strangulation, showed much more complex and distinct connections and ramifications between left and right sides than did 81—90 inclusive This is suggestive that Nature makes an effort to conserve body fluid by diverting it from the site of exit on the left to the unaffected right side Hence by the time the strangulation was performed considerable anastomoses had already formed between left and right lymphatic groups No 77 had a well developed right duct leading out of the right side lymphatics in the Thorax No 79 had a very marked net work of anastomoses No 73 showed a large anastomosis from the left duct to the Innominate vein direct

The Tracings (Fig III) show the effect of normal "Thoracic-duct-fluid" on the Blood Pressure of a 3 Kilo cat anaesthetised by Chloralose (10 cgr per Kgr), and of the "Strangulation-duct-fluid" upon the same cat There is a depression of the Blood Pressure temporarily where injection (of St d f) is made in small quantity, *e.g.*, 2—5 cc whereas there is no effect on the blood pressure after injection of Normal Thoracic duct fluid There would appear then to be a difference in content of the two fluids, apart from Haemoglobin, shown to be present by spectroscopic examination This effect was not due to Haemoglobin since injection of Haemoglobin, (Lysed blood), caused no fall of blood pressure in the donor cat Haemoglobin was obtained from the same strangulated cat, similarly, with the same effect Haemoglobin from a third and normal cat produced the same result in this dose

Fluids from each cat gave parallel results to those shown in the tracings

Conclusions and Summary

- 1 Normal Thoracic Duct Fluid does not affect the Blood pressure tracing
- 2 Strangulation fluid depresses the Blood pressure tracing temporarily



(Fig III)

3 This depressor effect is not due to the contained Haemoglobin

4 Fistularization of the Duct is followed immediately by opening up of left to right lymphatic anastomoses

5 Cats with a fistulae do not survive appreciably longer than those without fistulae

6 Drainage of the duct would not therefore appear to be a rational therapeutic procedure

7 The main types of termination of the duct as seen in my experimental cats are illustrated

8 The formation and arrangement of the ducts on the left and right is extremely variable

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INJURIES OF THE ELBOW JOINT*

BY

M G KINI, M C , M B , M CH (ORTH) , F R C S (EDIN)

The diagnosis and treatment of fractures has been a serious problem in India requiring consideration because of the appalling ignorance of the public who still believe in the village bone-setter and seek advice later with very marked and preventible deformities. The general practitioner also is ill-acquainted with regard to the method of setting of fractures and many serious disabilities have occurred as a result of this ignorance. Even Surgeons of repute do not bestow the necessary attention to this aspect of the problem in their enthusiasm to develop other aspects of surgery. The last war has shown the necessity of developing specialists to deal with this aspect of surgery. The late Sir Robert Jones, the pioneer in this line, had shown that lots of lives and limbs could be saved by adopting his methods of treatment and the result of this demonstration has been the development of orthopaedic surgery as a special branch of surgery. In every English and continental hospital there are specialists to deal with this aspect of surgery. In India the development of orthopaedic surgery is still in its infancy and orthopaedic surgeons cannot be produced without sufficient training and unless proper orthopaedic surgeons are developed it will be difficult to improve the methods of treatment of deformities and fractures. It would be necessary to develop a scheme to train and employ young men at least in teaching centres with facilities to work and develop and simplify the treatment of fractures and deformities according to the requirements of India. Operations mentioned in European text-books may not be applicable to Indians. Just to give an example, it has been found that arthodesis of the hip and knee joint which is an excellent operation for painful conditions of hip and knee is not tolerated by a poor or middle-class Indian patient who wishes to squat on the floor. He would rather walk with flexed hips and flexed knees than have straight hips and straight knees. Therefore it is necessary to evolve a scheme of treatment suitable to Indian conditions. (Vide "Role of oblique osteotomy in hip joint surgery" read before the Association of Surgeons). For a surgeon to live on a speciality of this type will be impossible in India as the majority of the people who sustain fractures are poor people and hence it is necessary that the orthopaedic surgeon should be started with adequate remuneration so that the wolf may be kept away from his door. An organised attempt to investigate the varieties, causes, and results of treatment of fractures in different situations has to be done with a view to give the result of observations and thus help and guide the practitioner with regard to the treatment of fractures and deformities. This method of investigation has another beneficial effect. It enables the teacher to train the students in the

* Read at the 3rd Annual Conference of the Association of Surgeons of India in opening a discussion

proper methods of setting of fractures and when they become practitioners will educate the public in the scientific methods of treatment and thus avoid a large number of deformities which result from ignorance and superstition. With the improved methods of treatment, limbs with bad fractures can be converted into useful functioning limbs by foresight and thought at the time of setting of fractures and by operative procedures wherever and whenever found necessary. Injuries round the elbow afforded a very serious problem on account of the many serious complications that arose as a result of bad treatment and who later sought advice for rectification of their troubles. More than 50 years ago H. O. Thomas taught the dangers of forcible stretching of elbows and in spite of this even to-day Doctors in their anxiety to restore the function of the elbow employ unwarranted manipulations causing crippling deformities. This is one of the reasons why I undertook the study of this problem (and here is the result of my study which you will see on the screen more than from my talk). 456 cases of elbow injuries were seen and treated by me from the year 1930 to 1939 and the following list shows the magnitude of the problem of injuries round the elbow joint. Of these, supra-condylar fractures and its complications, dislocations of the elbow and its complications, fractures of the head and neck of the radius and dislocations of the head of the radius with fractures of the upper third of the ulna and fractures of the olecranon process demand our attention.

I Supra-Condylar fractures

The treatment of this fracture has not received the necessary attention that it should receive from Medical men as a lot of cases were seen with marked deformities and functional disabilities long after the occurrence of this fracture. The majority of the cases were supra-condylar fractures and the following list shows the type of fractures met with in the series —

(1) Simple supra-condylar fractures	262
(2) Compound „ „	8
(3) T or L shaped simple supra-condylar fractures	5
(4) Separation of medial epicondyle	9
(5) Fracture medial condyle of the humerus	2
(6) Fracture outer condyle of the humerus	5
(7) Compound comminuted complicated fractures of the lower end of the humerus involving the elbow joint	4
(8) Simple comminuted T or Y shaped fractures	9
(9) Fracture separation at capitellar metaphysis	13
Total	317

The supra-condylar injuries showed the following anatomical varieties of fracture —

- (1) Simple crack fractures without displacement
- (2) Oblique fracture with displacement
- (3) Dicondylar fracture
- (4) Fracture of the medial epicondyle
- (5) Fracture of the capitellum with or without displacement of fragment
- (6) Fracture of the condyles, either medial or lateral
- (7) Comminuted fractures of the lower end involving the joint
- (8) T shaped fractures of diaphysis without involving the joint
- (9) Compound fractures

The most common complications found in the series were as follows —

- (a) Gangrene occurred in 2 cases
- (b) Volkmann's Ischaemic contracture occurred in 4% of the cases
- (c) Nerve injuries occurred in 8% of the cases, the commonest was the radial nerve and the second in order of frequency was the ulnar nerve and the third the median nerve
- (d) Malunion was the commonest complication forming 24% of the supra-condylar fractures which were admitted for treatment

The treatment adopted for supra-condylar fractures is closed reduction under an anaesthetic and immobilisation in plaster of Paris splints applied in a special way without interfering with the circulation of the elbow. One type of fracture requires special notice, *viz*, the capitellar fracture which occurs at the lower end of the elbow. This fracture is generally oblique and experiments done on the cadaver throws some light on the mechanism of the fracture and the displacement of the lower fragment which turns a somersault within the joint. This is the basis of a paper which has been sent for publication in the Bone and Joint Journal of the Orthopaedic Association. In this type of fracture it has been found that if the fracture occurred beneath the origin of the extensor carpi radialis longior and brevior the displacement was slightly outwards and upwards. On supination and adduction this becomes exaggerated but if the capitellum was avulsed due to tear of these muscles and tear of the anterior and posterior part of the capsule, then the fragment turns a somersault within the joint as is usually seen in radiographic pictures. Closed reduction after subsidence of the oedema has been the method of treatment adopted. The usefulness of this method became evident after follow-up of these cases. In text-books and journals open reduction with pegging of fragment to diaphysis is advocated, the closed method however has a definite place in the treatment of this type of fracture.

Of the complications Volkmann's Ischaemic contracture is the most serious and can be avoided if diagnosed early. One case has definitely shown that this catastrophe can be avoided by immediate operation to get rid of effusion. In the cases operated, it has been found that the spasm of the brachial vessel was the most noticeable feature. It felt like a cord and was easily mistaken for the median nerve and after removing the clot and effusion under the bicipital fascia and reducing the fragments into position, the pulsation returned after waiting for some time. Once the ischaemia is well established with contracture the method of treatment of constant stretching in early recognised cases advocated by Jones has served a useful purpose. Operative interference is useful but in bad cases it is of no use at all.

The nerve injuries which form a very serious complication were usually due to stretching of the nerve on the projecting end of the diaphysis and the forming of adhesions of the nerve to this projecting end. The radial nerve was found most commonly affected this way. Freeing the nerve gave good results and in one case a secondary suture had to be done. Ulnar nerve injuries were always associated with injuries to the medial epicondyle and in some cases of capitellar fractures with consequent changes in the alignment of the forearm to the arm. Primary involvement was rare but secondary involvement occurred due to constant stretching of nerve because of exaggerated valgus deformity in the elbow. They recovered after ulnar transposition with improved function.

Malunion with deformity and limitation of function is the most common of all the complications. Flexion of the elbow was most affected and this was due to the mechanical impediment of the projecting piece of the diaphysis and the method adopted has been to cut away the projecting diaphysis and in some cases in addition to cutting of the diaphysis refracture and realignment of the fragments was done with very satisfactory results.

Compound fractures occurred in 2.5% of cases and the treatment adopted was to employ skeletal traction through the lower ends of the radius and ulna and to keep the limb in extension in Thomas's arm splint after debridement and free drainage. Most of the cases came 2 to 3 days after the injury and the limbs have been restored to quite a useful function though in some cases ending in slight gunstock deformity.

II Dislocations of the elbow

Dislocations of the elbow which were badly treated afforded a unique opportunity for the observation and correction of the conditions resulting from imperfect or inadequate treatment and formed 13% of total injuries of the elbow. Most of the dislocations occurred in adults. There were only 9 cases out of 61 in which the patients were under 14 years of age, the youngest patient being 9 years old. There were 51 males and 10 females. The

treatment of elbow dislocation is simple when the patient is seen immediately after the accident, provided the following principles are observed —

- 1 Radiographic examination before reduction and preliminary investigation for nerve injuries
- 2 Reduction of the dislocation under anaesthesia and a second radiographic examination after reduction
- 3 Proper splinting of the dislocation after reduction to prevent effusion into the joint and the surrounding tissues
- 4 Enforcement of sufficient rest to permit the completion of the process of healing inside the joint
- 5 Institution of graduated active exercises with physio-therapy after removal of the splints to restore function.

The routine practice adopted was to reduce a recent dislocation of the elbow under a general anaesthetic. After reduction, the elbow is immobilised in flexion with the forearm in supination in plaster of Paris for a fortnight. At the end of that period, the plaster of Paris is removed, and active movements and massage are instituted. After the conclusion of the exercises, the elbow is always rested in a Jones collar-and-cuff splint. When the movements are quite free and painless, the splint is discarded. This method of treatment has given very satisfactory results. It has been found in cases of dislocations either the general practitioner has not recognised a dislocation or the bone-setter who saw the majority of the cases under review was not capable of diagnosing such a condition. They simply tried to cure the swelling and not the displacement with the result that a large number of cases came with persistent posterior dislocation and in some cases with marked myositis ossificans (traumatic osteoma), the result of forcible movement done in their anxiety to restore function quickly. Even in cases where the dislocation has been reduced, myositis ossificans occurred, as a result of the use of force to restore function. This use of force has a bad effect. In the region of the elbow it is peculiar that the granulation tissue replacing the haemorrhagic area forms the preosseous substance of Leriche and Policard in which calcium and ultimately bone gets deposited. To appreciate these changes it is necessary to understand the problem of bone growth in its modern conception. It is well known that in growing bones the metaphysis, the epiphysal cartilage and the epiphysis are the centres of bone activity which are controlled by adequate vascularisation, sufficient concentration of calcium salts and the presence of phosphatase enzyme which governs the physico-chemical mechanism of calcification and all these processes in turn are governed by endocrine balance. In the growth of normal bones, the cartilage cells multiply in an orderly method, enabling all the biochemical processes to go on regularly, forming ultimately new bone and thus adding

to the length and circumference of the bone. In all these processes, the process of resorption, tubulation and calcification determine the shape and structure of the diaphysis. It is now accepted that the bone cell, which was supposed to have the function of bone formation has no such function. It is considered that the bone cell of Purkinje is nothing but a fibroblast, imprisoned in bone and in a state of quiescence, but having the power of assuming the primitive mesenchymal condition at any time when there is a demand for it, in this state, inorganic salts of calcium may be deposited in it, absorbed, re-deposited and re-absorbed according to the influence of the enzymes and the circulation under control of endocrines. Thus it becomes clear that for bone to be deposited a fibroblastic structure with excess of calcium is necessary. This balanced development may be altered and in the region of the elbow where haemorrhage occurs as a result of injuries this haemorrhage is ultimately converted into granulation tissue which forms the preosseous substance in which the physio-chemical changes enumerated above take place thus giving rise to bone. This change is peculiarly noticeable in the region of the elbow and if forcible movements are used in the anxiety to improve the movements the result will be development of myositis ossificans, this takes place next to bone and in some cases shows lamination corresponding to each forcible manipulation and may occur in muscle fibres when they are torn. This condition has occurred in all types of injuries of the elbow where this disastrous line of forcible movement has been adopted. If a surgeon or a practitioner wants to improve the function of the elbow my advice is to quote the Latin saying "*Festino Lente*," (make haste slowly) and active and not passive movements should be the guiding principle.

Complications—Various complications may occur after dislocation of the elbow. In the series, nerve injury occurred in two cases, myositis ossificans in 25 cases and unreduced dislocations with fixation of the elbow with or without newbone formation in 23 cases. There were two compound dislocations of the elbow of which one was anterior and associated with fracture of the ulna and the other a posterior dislocation. Old Volkmann's Ischaemic contracture was found in one old man. He was admitted for an injury of the chest and according to his history the contracture had occurred 20 years before admission. The treatment of unreduced dislocation afforded a difficult problem. Open reduction was practised in 6 cases of unreduced dislocation in children but with fair success. Though the elbow was put in a better functional position yet the movements at the elbow were very limited. In one case (an adult) a false reduction occurred while attempting closed reduction the ulna breaking and improving in the range of movement. This is an example of Thomas's false reduction. The treatment of myosificans is a difficult problem, excision of this new formed bone after it is well consolidated has been advised. In the cases under review, in myositis ossificans of a diffuse nature, removal did not improve the range of movement at the elbow. In the majority of the cases the new bone was adherent to the

lower end of the humeral diaphysis above, or to the olecranon, the coronoid process or the head of the radius below. In such cases excision has not given satisfactory results. In 4 cases, however, where the new bone was attached to one end of the diaphysis by a well developed pedicle free from any other attachment, excision has resulted in satisfactory restoration of function. In cases of marked new bone formation with limitation of movement or in cases of persistent posterior dislocation of the elbow, operative treatment had to be undertaken. Arthroplasty of the elbow was done in one case. But this procedure was not repeated in other cases because of the difficulty of developing a team with perfect aseptic technique to co-operate in the removal of *fascia lata* in order to minimise the operative time, as most South Indian patients do not stand prolonged operation. In arthroplasty administration of a general anaesthetic is necessary which adds to the shock of the operation. The simplest method of operative intervention to restore the movements of the elbow is a properly designed excision. This operation gives the same satisfactory results as arthroplasty, and the author has used the following technique with success.

Operative technique—In the majority of the cases brachial-block anaesthesia with 2 per cent novocaine was used, and the technique employed was that of Labat. Through Langenbeck's incision sufficient bone from the lower end of the humerus and the upper end of the ulna is excised to produce a gap of at least one and one-half inches. The bones are shaped to resemble the normal articular ends and are smoothed by a file. To keep the bone ends apart, skeletal traction from the lower end of the radius and of the ulna is obtained by Kirschner wire. After a firm bandage has been applied to the elbow to prevent effusion, the limb is put in extension in a Thomas arm splint for a fortnight. At the end of a week, the stitches are removed without disturbing the traction, at the end of a fortnight, the Kirschner wire is removed, and active flexion to 160 degrees is usually obtained. To prevent effusion as a result of this movement, the elbow is supported in a plaster of Paris cast. This method of active flexion is repeated from day to day until flexion of from 45 to 50 degrees is obtained. When this stage has been reached, active movements with physio-therapy are started to restore the normal function of the muscles controlling the elbow joint, which, as the result of disuse, have generally atrophied. The elbow is always rested in flexion by a collar-and-cuff splint. In about two months' time the power to flex and to extend the elbow against resistance is easily restored, and the patient is discharged to carry on the treatment at home.

End results—To evaluate the success of this treatment, it is necessary to test the results from two stand-points (1) the cosmetic effect, (2) the weight-lifting capacity. An elbow which moves freely following excision does not necessarily have good function, this was found to be true in some cases in which the patients sought advice for disability after excision of the elbow elsewhere. The following tests for function should be conducted —

- (i) Flexion and extension without weight, with the arm by the side and the forearm in supination
- (ii) Flexion and extension without weight, with the arm abducted at the shoulder to a right angle in full extension and the forearm in supination
- (iii) Flexion and extension with weight (usually ten pounds) with the arm by the side and the forearm in supination
- (iv) Flexion and extension with weight, with the arm abducted at the shoulder to a right angle and the forearm in supination

Of the fifteen patients treated by the technique described, all but one had a normal functioning elbow. In the one case in which the result was unsatisfactory the patient left the hospital during the course of treatment. When, after repeated letters had been sent to him, he reported for inspection, he had flexion to 70 degrees and extension to 130 degrees.

III Fractures of the head of the radius

Fractures of the head and neck of the radius formed 12% of the total injuries of the elbow. A comprehensive review of all fractures with follow-up results is essential to crystallise definite methods of teaching and treatment. Very little has been written about this type of fractures and dislocations and the disabilities that result therefrom. The following types of injuries have been found in the region of the head and neck of the radius —

- (1) Marginal fissured fractures of the head of the radius without displacement
- (2) The same with displacement
- (3) Hemi-fracture of the head of the radius with displacement
- (4) Fracture of the neck of the radius without displacement
- (5) Fracture of the neck of the radius with displacement
- (6) Green-stick fracture of the neck of the radius at metaphysial end.
- (7) Comminuted fracture of the head of the radius
- (8) Green-stick fracture at neck of radius at metaphysial end with fracture of the tip of olecranon
- (9) Green-stick fracture of the upper third of the ulna and green-stick fracture of the neck of the radius at metaphysial end
- (10) Fracture of the upper third of the ulna and the neck of the radius

- (11) Dislocation of the elbow with marginal fissured fracture of the head of the radius
- (12) Dislocation of the elbow with fracture of the neck of radius with displacement

It is interesting that in the case of fractures of the head and neck of the radius some are very simple crack fractures while others are very difficult to deal with. The simple crack fractures are the bone-setter's dream because they unite causing very little disability. They later seek advice for osteo-arthritic changes due to want of proper care after setting of fracture. The simplest of the fractures are marginal fissured fractures of the head of the radius, and crack fractures of the neck of the radius without displacement. These fractures, if properly treated, do not incapacitate a person but occasionally give some pain and in two cases which were followed up, it was found that they were able to play tennis without any difficulty. Fractures which are comminuted require operative removal of the head which is generally done after the 2nd week when the swelling has subsided and the healing process has started. In the case of fractures of the neck of the radius where there is no displacement, good firm union takes place with no subsequent trouble. In those cases where there is displacement, a replacement is indicated and in old cases with malunion, it is better to remove the head of the radius. No immediate or late complications of nerve involvement have been noticed in any of the cases under review. The result of excision of the head of the radius has been found to be good from the replies that have been received and in some cases that have been followed up. The head has been found to reform and remould illustrating the Wolff's law of "Adaptation of structure to function."

IV Dislocation of the head of the radius with fracture of the upper third of the ulna

Forward dislocation of the head of the radius was occasionally seen as a congenital deformity. Two such cases were recorded in the series. Forward dislocations of the head of the radius never occurs without any other associated injury. Usually it is associated with fractures of the upper third of the ulna. In one case however there was a posterior dislocation of the head of the radius with a fracture of the middle of the shaft of the ulna. It was believed from the time of Monteggia (1812) that this type of injury was the result of direct violence causing a fracture of the upper third of the ulna with bowing forwards of the fracture and thus levering out the head of the radius. Only one case gave such a history in the series and it was associated with radial paralysis. In the majority of the cases, the history was a fall on the out-stretched hand probably with marked pronation. Dislocations of the head of the radius do not occur in cases of green stick fracture of upper

third of the ulna without remarkable bowing forwards of the broken bone or in complete fractures of ulna without displacement of fragments. In cases associated with dislocation of the head of the radius the bowing forwards of the fragments or the displacement of the fragments is a remarkable feature. At operation in cases of dislocation it was found that the orbicular ligament was torn along with the anterior part of the capsule and lateral ligament. On the cadaver it was found that when the orbicular ligament is torn along with the capsule and lateral ligament, the head of the radius becomes very wobbly and this is what happens in the case of dislocations. In such cases reduction is easy but maintenance is difficult. The biceps is found to be in marked spasm along with the pronator radii teres.

The signs and symptoms of this fracture and dislocation are characteristic and a radiographic picture shows clearly the displacement of the fragments and the dislocation.

Complications—In one case the radial nerve was injured, in two cases fractures of the upper third of the ulna were associated with fractures of the neck of the radius. In the majority of the cases the dislocation of the head of the radius was undiagnosed and admission was sought for malunion of fragments of ulna and persistent dislocation of the head of the radius.

The treatment of this fracture and dislocation is simple. If the fragments are not displaced, the treatment is easy. The elbow is kept at a right angle in plaster in supination for 3 or 4 weeks. If the fragments are displaced, it is essential that the alignment of the fragments should be restored, otherwise the head of the radius will not remain in its place, and this can be done in simple cases by closed reduction, in difficult cases open reduction may be found necessary. It is unfortunate that in the majority of the cases the dislocation of the head of the radius was ignored or not diagnosed and it therefore becomes necessary that in all these cases when X-Rays are ordered in suspected cases of fracture of upper third of the ulna, the elbow joint should be included in the X-Ray picture. Once the reduction has been done, it is maintained in flexion and supination either at a right angle if it is without displacement and at a suitable acute angle in cases of marked displacement and the limb is put in a plaster of Paris splint and kept in this position for 4 weeks. In old cases of persistent dislocation where there is a fear of non-union, excision of the head gives good results. Some of the cases of persistent dislocation of the head of the radius cause no functional disability apart from the aesthetic appearance of the elbow and in such cases interference is not indicated.

V Fractures of the olecranon process

Fractures of the olecranon occur as a result of direct violence and the displacement depends, as in cases of fracture of the patella, upon the tear of the triceps expansion. In the majority of the cases, the fractures were minor

cracks with very little displacement In one it was comminuted and the restoration of the alignment of the fragments was done by pegging In cases where there is very little displacement, it is necessary to operate The fragments can be brought together and kept in that position by strips of adhesive plaster and the limb is fixed in extension for 3—4 weeks in plaster splints Later active movements and massage are undertaken with a view to restoration of function In cases where there is marked displacement, open operation and suturing up of the fragments is necessary In cases where the fragments are comminuted, it may be necessary to remove the fragments and in such cases the restoration of function is satisfactory

These are my observations gathered from my recorded evidence and follow-up attempts I have placed before you the crystallised thoughts as they occurred to me I have tried to solve the difficulties that I encountered in my own way If you think they are reasonable I shall be happy to know that you have tried them If you have better methods I shall be delighted to know them and if you think they are defective I am prepared to meet the criticisms In all this work I have kept before my mind's eye the lines of Cowper

“ Knowledge and wisdom far from being one
Have oft times no connection Knowledge dwells
In heads replete with thoughts of other men
Wisdom in minds attentive to their own
Knowledge is proud that he has learned so much
Wisdom is humble it knows no more ”

Dr KINI illustrated his lecture with numerous skiagrams, sketches and photographs from his cases A discussion followed

DISCUSSION—INJURIES OF THE ELBOW JOINT

DR SURYAVANSHI

I have got only a few points about this subject 'injuries to elbow joints' This subject has been dealt with exhaustively by Dr KINI It is agreed by surgeons all over the world that in the case of an injury to elbow, it is almost next to impossible to attain perfectly normal function It requires very accurate knowledge of the anatomy of the injury to the elbow and in places where there are no X-rays, we can guess more or less accurately what might have happened In a place where there is no electricity and no radiogram, we have only to be satisfied with our clinical knowledge of anatomy Injuries to the elbow are quite common occurrences in mufussil towns With regard to the engineering student which was referred to by the opener of the discussion, it was stated that he fractured the elbow partly as a result of muscular violence We were shown pencil sketches I should like to know the age of the boy Was it definitely ascertained by means of X-ray that it was only a fracture and not separation of epiphysis? These two points were not made clear My personal view is that as a result of muscular violence, there would be separation of epiphysis, rather than fracture That would depend upon the age Secondly I do not understand the rationale of transposing the ulnar nerve in order to get freedom of movement It has something to do with age, but we all know that extension of the elbow and the triceps have nothing to do with the ulnar nerve We know that limitation of movement depends upon adhesions or mechanical obstruction I really do not understand whether transposition of ulnar nerve is necessary As regards movement, we know that the status of the patients in this country differs very much I should differentiate between the degrees of movement of the elbow in the right hand and in the left hand The first necessity for a labourer is not so much to earn his livelihood as to be able to eat his food That is what patients most bother about With the right hand he should be satisfied if he can do no more than to have an elbow at the usual optimum position for eating with his hand and not have to use a spoon or fork which he cannot afford to do If the right hand at the usual optimum position, almost at a right angle, if he wants to reach at something, he can flex his body and reach it If you give a more obtuse angle, then matters might become more difficult especially while eating It will be all right with the left hand to get a more obtuse angle If he has got to work he might handle with his left hand

As regards Cadaver experiments, it could not be useful because in a Cadaver there is no muscular action It purely depends upon the movement, given by the experimenter and may be mechanically modified by the ligaments and joint surfaces, and bony outlines

DR KAPUR

I have got just one or two points I may be permitted to throw out a suggestion, on such occasion, that a lecturer should devote less time to a written discourse and give more time for discussion to enable members to pool their experiences I think probably that would be more in keeping with the spirit of such lectures

The method described in treating these injuries of the elbow, must be assessed in its true perspective too much optimism won't do I think in injuries to elbow, no matter whatever the treatment, there is a certain percentage of cases where it is beyond the capacity of the surgeon, however well versed he may be, to meet with cent per cent success There is bound to be a certain percentage of failures I would warn particularly parents, because these injuries occur mostly in the case of children It is impossible to guarantee cent per cent cure and I think it is due to no lack of knowledge or skill on the part of surgeons, but is inherent in the injury in that region, because the

fossae in the lower end of humerus are liable to be encroached upon by the developing callus. The method of Sir Robert Jones has had its day and, as we practised it and came to see its limitations, it has given place to better methods. I remember certain practitioners just starting their surgical life, have had to pay very heavy damages for complications caused in the course of such treatment. I emphasize that methods are meant for surgeons and not surgeons for methods. One of the disadvantages in this method are that you keep the arm in supination and in that position, the flexor-pronator muscles would be put on stretch and would pull on the lower fractured fragment, if, however, the forearm is kept in pronation, the lower fragment of the humerus would be more relaxed and would fall in line more easily than when you try to treat these injuries in supination. I have practised both methods for over two decades and I can speak from experience, and I may say, that the forcible traction applied during manipulation fails too often to bring about a satisfactory alignment. In such cases continuous skeletal traction by the Bohler method on an abduction splint, produces better results, and here I may mention the epoch making contributions of Bohler to the entire domain of Orthopedic Surgery.

Regarding injuries to the nerves, the percentage that the learned lecturer gave was a bit more than I was accustomed to and probably I thought that it may be due to the method used because the flexion and supination method of Sir Robert Jones brings about a dangerous compression on the nerves, which may also get stretched over the sharp upper angle of the lower fragment, if the latter has not fallen into proper alignment. Pronation of the forearm and mild flexion of elbow joint as would be secured in Bohler's abduction splint, would minimise this complication.

As regards massage, every rule has an exception and I wish to make an exception in the case of injuries to the elbow, so far as massage is concerned. These injuries occur mostly in boys and young people and in their case we omit the massage. You can do massage in the case of every other fracture, but it is injurious in treating elbow injuries as it is likely to stimulate bone forming elements in the area round about the fracture. That is my experience of massage. A child may take a longer time to regain the movements, but massage would not help much.

About Volkmann's contractures, the lecturer said he operated six hours after injury. I was under the impression that Volkmann's contracture took some time to develop. Clinically one notices it when in flexing the wrist, there is inability to extend the fingers and that would be in the 2nd or 3rd week. A few hours after the injury there is effusion round about and I do not know whether one would be able to recognise or foresee that Volkmann's contracture is going to develop.

I may mention as a matter of experience that sometimes it occurs in very trivial injuries about the elbow—it is not necessary that the contracture shall necessarily follow a tight splintage. This would be helpful particularly in some litigation cases. Whether it is due to vaso-spasm or venous-obstruction or pressure upon the artery it does not matter. The practical point is that the Robert Jones position in a swollen elbow would increase the compression effects and its incidence. But could one within six hours of the injury foretell the supervention of this contracture?

DR V L PARMAR

At the outset, I must thank Dr. Kini for his very able exposition and I think he has done us a great service in bringing to our notice the fact that doctors do not take much interest in affairs of the bones, whether they be fractures or dislocations, and they shelve the matter so much that I have seen that in large places like Ahmedabad, Rajkot and even Bombay persons who get fractures go to a bone setter—I have known even well-to-do people going to a bone setter rather than to a doctor. I think doctors must

make up their minds that they are going to learn something about fractures and that they are the proper persons to treat them, the result would be that we would not have the shocking results we get nowadays from the bone setter. It is not his fault, he does his best with his limited knowledge, you go to him and he serves you. The fault is of the doctors who do not take interest, I have even seen doctors sometimes recommending people to go to bone setters.

My rule in fractures at the lower end of the humerus, especially in children, is to take them to the screen and get them X-rayed and reduced and put in plaster and not to leave the child with a cuff and collar—for the reason that with any cuff and collar the child lifts the hand and as it does so the arm has a tendency to fall on account of gravity, and therefore the fragments have a tendency to shift.

Regarding massage in children, I never advise it. In adults also, as far as possible, I do not advise it. It is said, and very rightly, that Bohler never uses massage and I have seen his results, after returning from Vienna in 1930 and 1936, I have omitted massage from the regime of such fractures or dislocations. The only massage that I advise the patient to do is to what he can do himself. It has been estimated that about 80 per cent of cases of myositis ossificans is the result of massage. The masseurs are very demonstrative to the patient and tell him "I will straighten out your elbow, bear with a little pain" and such like. It is quite natural that after fixing the elbow, for anything from 3 to 6 weeks after such an injury, there is definitely a certain amount of stiffness, and the patient, not having any more pain, would like to have normal functioning of the limb as soon as possible, and not getting that within a fortnight or so after the removal of the splint or plaster, he is anxious to get at some one who can give him relief without going to a doctor who might put him under an anaesthetic. If you leave him alone, or if he exercises actively himself or massages it himself, so that he will do so only so long as it is absolutely painless to him, I do not think you would get many cases of myositis. As regards treatment, in the majority of cases all I have done is just to put it in plaster and keep on putting it in plaster month after month—6 or 8 or 10 months—till such time as you find that there is no more absorption. Then is the time to review the situation, and consider whether this piece of bone is really acting as a mechanical block or not, before removal of bone I always take another picture to see that the bone that you see is thoroughly consolidated and has become almost like normal bone and that there is no further chance of its absorption.

I would like to know from the lecturer whether Volkmann's contracture would occur with a fracture at the lower end of the humerus which has not been put in flexion. We generally get this complication in cases that have been put in acute flexion and in such flexion there is some obstruction to circulation. I always make it a point not to put in full flexion, but only sufficient flexion to ensure that circulation is free and you can move it a few inches. If this is done, I do not think there is much chance of Volkmann's contracture, after a few days when the swelling has subsided I gradually increase the flexion seeing all the time that there is no obstruction to the circulation.

DR CHOPRA

Dr Chopra said that the Supra-condylar fracture without displacement will take care of itself even if left alone in a cuff and collar. Where there is displacement he reduces it and puts the limb in plaster with the hand against the shoulder on the injured side. The plaster is applied only to the back of the limb, the front being left free, a figure of 8 bandage fixing the plaster in position.

PROF NIGAM

Prof Nigam discussing the question thought that in ordinary practice, the ideal treatment presented by Dr Kini was difficult to carry out as X-ray diagnosis of injuries

was not feasible in most Hospitals and the public had not been educated to the need of early treatment of elbow injuries. Delays of 2 or 3 weeks after the injury during which manipulations by untrained persons were practised occurred commonly. He advocated correct and early reduction of the fragments under the fluorescent Screen and fixation in Plaster of Paris for a sufficient period to ensure firm union. He was in favour of early active movements, but did not forbid passive movements carried out with care by trained men. He agreed with the general opinion that Volkmann's contracture was a calamity to be prevented by assiduous care in the early stages and removal of pressure of every kind, but that once it had occurred very little could be done to cure the condition. Regarding measures for the relief of limitation of flexion following such injuries, he did not think that transposition of the ulnar nerve was of any benefit.

DR B N SINHA

There are certain points in the course of this discussion which have particularly struck me, especially as I am engaged mainly in the practice of orthopaedic surgery. During the last two years I have had the chance of treating 236 cases of injuries to the elbow joints at the King George's Hospital, Lucknow. I have also kept a record of 20 cases, treated by me outside the Hospital. With your kind permission I would first take up a few points regarding supra-condylar fracture. We have discussed here the cuff and collar method and the plaster method of immobilisation and I use, as far as possible, the latter technique. The method I have found most useful, is to give the patient a posterior plaster slab and then apply a figure of 8 plaster bandage between the forearm and the arm, which Dr Chopra has just mentioned. The anterior slab has been purposely omitted so that the risk of pressure on the cubital vein is obviated. The plaster method gives a definite immobilisation, at the same time maintaining the acute flexion of the elbow joint. The swelling of the elbow becomes less and less and the patient can move about without pain with a sling round his limb. After a week or so when the swelling round the elbow joint is reduced, this plaster becomes loose and therefore it should be changed with due care to maintain flexion for about 4 weeks after which the plaster cast is entirely taken away. The cuff and collar method had its day and is certainly useful in its limited scope.

In all these cases a great deal of discussion has taken place about the question of massage of the elbow joint. I personally feel that complications specially of myositis ossificans are due to one reason alone and that is massage. I have seen that a large majority of cases have developed myositis ossificans because of passive movements and massage given by quacks or even enthusiastic medical men. After some time the quack discovers that in spite of his movement and massage he is unable to set right the fracture and finds that the elbow becomes stiffer and stiffer. In the average class of patients attending the out-patients Department, I think, it is essential that we should take extra care to warn him against the harmful effects of massage. I will pass round some X-ray plates of myositis ossificans in persons of all ages. Having followed these cases closely both clinically and radiologically, I have come to the conclusion that myositis ossificans sets in with massage and goes on increasing the more the massage is kept up.

In this plate of a lady 40 years of age, skiagram showed myositis ossificans and I immediately put her elbow in plaster of paris cast for 8 weeks. She was re-X-rayed and the plate showed that the shadow due to myositis ossificans has disappeared. I beg to submit that it is better to err on the side of greater immobilisation than to allow early movements of the elbow joints.

In those cases where rest does not cause the disappearance of myositis ossificans, repeated plasters should be given for a period of about a year and a half so that

localisation of the new bone takes place. Then alone the operation for excision of the bone should be taken up. The next plate shows myositis ossificans forming an entire bridge from the humerus to the ulna anterior to the elbow joint, operation was taken up and we found after incision that it was easy to separate the new bone and it was removed. The capsule of the elbow joint was free. After the removal of the stitches the patient was allowed active movements and he regained perfect function.

Here is another skiagram in which the capsule of the elbow joint is also involved. In this particular case I excised the anterior part of the capsule with the new bone and found the function of the joint was good. In my series of cases myositis ossificans followed more frequently after posterior dislocation of the elbow joint than after a fracture.

I would therefore like to mention respectfully that the cause of myositis ossificans clinically is massage and the treatment for it is that we should impress upon the patient and ourselves the value of complete rest to the elbow joint. The more we respect the tissues around the elbow the greater the respect we receive from them so that we are spared from the unpleasant task of treating complications.

The next point I wish to make out is regarding Volkmann's Ischaemic Contracture. I am afraid I would be treading here on tender grounds when I take courage to say that in my small experience spasm of the arteries of the forearm is not a causative factor in the production of this disease. It is very often said that after setting a fracture around the elbow or in putting the elbow in Plaster of Paris, one should feel for the radial pulse and when it disappears, it should be considered a sign of Volkmann's Ischemic Contracture. I feel that if you wait for radial pulse to disappear you wait for the complete picture of this serious disease, where the damage has already been done to the patient, therefore, it should be our attempt to make a diagnosis at an earlier stage to prevent the horrible after effects of Volkmann's Ischemic Contracture. The treatment of this condition should be started as soon as the initial onset is recognised and I may mention that it is not difficult to diagnose the condition if a few points are kept in mind. After setting an elbow or reducing a dislocation of that joint and plastering, one should look for a few clinical points —

- (a) Persistent dull ache which the patient is conscious of all the time
 - (b) Blueness of the nail beds
 - (c) Inability to move the fingers actively
 - (d) Oedema of the fingers and the presence of blisters on the forearm or fingers
- In any case where the blister has appeared prevention of Volkmann's Ischemic Contracture must be undertaken.

To my mind whether the radial pulse is present or not when the patient displays the above signs of circulatory embarrassment in his forearm after plastering, he should be released from that plaster and treated for Volkmann's Ischaemic Contracture.

It will be only in the fitness of things, therefore, to recognise that the treatment of Volkmann's Ischaemic Contracture should really aim at its prevention, as the curative treatment is unfortunately unsatisfactory.

In one of my series of cases I plastered the patient for a fracture of the forearm bones under local anaesthesia at about 2 o'clock. An hour later there was blueness of the nail bed and difficulty of movement of the fingers. The limb was raised up and the plaster bivalved, but the patient still complained of pain in moving the fingers, and was uncomfortable. I found the radial pulse present all this time but at about 7 P.M. I removed the plaster and I noticed the onset of the Volkmann's Ischaemic Contracture having taken place. There was a marked swelling of the forearm pitting on pressure, and

a few blisters here and there So I took the patient to the Operation Theatre and made multiple incisions on the volar aspect of the forearm cutting down to the deep fascia A lot of blood-stained effusion came out and the muscular bellies protuded out of the wound with a brick-red colour and marked intermuscular oedema Dressing was done and the patient's limb again put in a posterior plaster slab The condition of the forearm steadily improved and the patient has done very well only with one defect in the limb that there are a few marks of the incisions left, but what is it in view of the perfect function that the patient has got back?

Now with regard to Chronic Volkmann's Ischaemic Contracture, I am afraid I do not entertain much optimism regarding treatment My senior friend Professor Kim has mentioned in his learned discourse about MaxPaige's operation and the question of its value I have no wide experience of this particular operation but I may be allowed to mention that I have done 4 cases and found the result satisfactory I think that the operation, to be successful, should not be delayed long and should be performed roughly within 3 months or so If delayed the contracture becomes more and more marked and secondary changes take place in the various joints of the wrists and the fingers which adds to the difficulty in the restoration of function and thus adversely affects the results of the operation Another point which is again very important in relation to MaxPaige's operation is that gradual manipulation must be done as an essential post-operative measure

It is remarkable that in my series of cases of injuries around the elbow joint I have very few cases of nerve involvement I am greatly impressed by the fairly large percentage of cases of ulnar nerve complications described by the learned Professor Kim I may be permitted to say that a good number of nerve injuries are probably caused by improper handling by the quacks and the roadside sympathisers who try their first aid when an accident takes place I have had one case of ulnar neuritis which developed a few months after the supra-condylar fracture was set and I treated the patient with a successful transposition of the ulnar nerve I do not possess any experience of ulnar transposition as mentioned by Professor Kim I do feel that there is much argument in favour of a wider application of this operation and I will certainly try it in my cases and see with what success

Here are two plates which demonstrate supra-condylar fractures situated about $\frac{3}{4}$ " above the level of the elbow joint The patient was brought to me after about 5 weeks had elapsed and malunion had taken place I treated him by a reconstruction osteotomy and immobilised the limb in Plaster of Paris after proper reduction The union of the fracture as well as the function of the elbow joint has been quite satisfactory

The other point in relation to the fracture around the elbow joint, that I wish to make out is that open reduction should not be done as far as possible, as in my opinion, most of the cases do very well by manipulation I beg to present before you these skiagrams of a compound comminuted fracture in the lower end of the humerus which was treated by manipulation and plastered for about 9 months Without any further treatment, let me pointedly mention that without any massage, the patient recovered full function of the elbow joint

May I bring forward another point which is very much within the scope of this discussion of the injuries around the elbow joint I refer to sprain of the elbow Pain and swelling is often marked in sprained elbow and if the limb is placed in a plaster cast for about 2 to 3 weeks the results would be very satisfactory I wish to emphasize again the point about complete rest in relation to injuries around the elbow and, however minor the damage may be, very expert physio-therapeutic measures should be undertaken and under no circumstances common wayside massage treatment

I strongly feel that no other splint except a plaster splint should be used in the treatment of injuries around the elbow joint as faulty immobilisation is responsible for many cases of ankylosis of the elbow. This is a necessary corollary to the statement regarding rest which I have made above.

Sir, I have tried to place before you a few of my observations on this difficult subject and to have your guidance as regards the value of their application or otherwise. I am very thankful to you and to the various learned surgeons in this conference especially Professor Kini from whose lecture I have received enough food for thought. I hope you will kindly favour me with your experienced and considered opinions on the various points raised above.

DR KIRWADKAR

I am a general surgeon, not an orthopaedic surgeon and what I say will not have the authority of an orthopaedic surgeon. My experience has been a limited one and therefore it deserves your consideration more, because in India there are more villages than towns or cities. Unfortunately I do not know if the things that are taught now in our medical schools do not have a good deal to do with the unsatisfactory conditions that we find in the treatment of bone injuries and joints. In my days as a student, I think most of us neglected bone injuries and their treatment because our professors also neglected it. I hope that things have improved now and from the interest taken by the younger generation in the treatment of bone injuries I can very well imagine that things are much better now than before. But I think it is the duty of the Association of Surgeons to impress on the college authorities, on the universities and on the Medical Council as well, that orthopaedics is not a specialised job which may be left to post-graduates but orthopaedics of a general type should have a prominent place in the teaching of undergraduates.

I join issue with my two friends who raised objection to the remark of the learned lecturer about the improvement that was found in extension of the elbow after the transposition of the elbow after the transposition of the ulnar nerve. I do think some improvement is possible, but if the limitation of extension and flexion is due to adhesions in the joint and other mechanical conditions, I do not think any nerve operation is likely to improve his condition. As regards the treatment of mal-united fractures, especially supra-condylar fractures, a mere operation of osteotomy is not going to help much. I quite agree with Dr. Kini that removal of the osteoma whatever the stage may be, will be more conducive to the restoration of movement than mere osteotomy.

Regarding the treatment of Volkmann's contracture, I think that it is always best to prevent it rather than allow it to develop to a stage when treatment will be necessary, therefore keeping our eye not only on the radial pulse but also on the oedema, on the condition and movement of the fingers and specially on the symptoms of the patient, that is, his pain, I think in some cases we can prevent the onset of this trouble. I remember distinctly a few cases in which the condition had not set in, but we expected from the symptoms that it would most probably set in, and steps were taken to prevent it. Of course, after it sets in, then the question is much more difficult.

As regards the line of treatment, there has been a controversy here, and I think it is best to say this: those who do not belong to one school of thought should keep an open mind and suit their own line of treatment to the type of case that they meet with. In the majority of cases, the Robert Jones treatment will succeed very well. But there are certain cases at least that may not be in the hands of a surgeon who has had his training under Sir Robert Jones himself, but under others who had not that fortune. In

other hands the method does not always succeed, and when it fails I think Dr Kini's dictum is useful—try it not once, but twice and thrice and then only you may say that the method has failed, then the choice is either an open reduction or Bohler's treatment. I think that in many cases Bohler's treatment is better than open reduction.

About massage, I think the point has been stressed very well that in elbow joint treatment massage has no place. If it has not given rise to myositis ossificans, it has given rise to limited movements, and adhesions and therefore only active movements which the patient can make without any appreciable pain should be allowed and encouraged. No massage should be advised, specially when we cannot ensure that the proper type of massage will be given.

With my limited experience I cannot share the optimism of our learned lecturer. I have had certain cases treated not only by persons with limited orthopaedic experience but persons who had better orthopaedic experience and training also. In their hands too some of the elbow joint cases have been not complete successes, and therefore one cannot give a guarantee of cent per cent success in most cases. Specially that is the case with adults and older boys. In children the outlook is always better—the healing is better, the deformity is less and the movements when restored are also greater, but in adults I have seen that the results are not so good, and adhesions limit the range of movement to a great extent. Specially is this the case when the fractures are compound and comminuted.

DR M G KINI in reply

Dr M G Kini in reply to the debate stated that he was glad he had stimulated a lot of interest in the treatment of injuries around the elbow joint. He agreed with the observations of some that the subject could have been limited to one type of injury of the elbow joint instead of a comprehensive review of all the injuries of the elbow joint. He stated that he took this comprehensive subject of injuries of the elbow joint to stimulate interest in the treatment of all the injuries of the elbow joint which he found were very badly treated. Regarding the observation about the method of treatment pointed out by several members, he observed that no 'rule of thumb' method was successful in the treatment of fractures of the supra-condylar type. He referred the members to the various anatomical types of injuries which were shown on the screen and each type required a thorough understanding in the reduction of the fractures and 'common-sense point of view' should prevail in the selection of the method of treatment. Neither Bohler's or any other dictum could solve all the problems that confront the Orthopaedic Surgeon. Regarding the observation about Robert Jones's method of treatment by 'cuff-and-collar,' he stated that it is a very useful method to be practised by the general practitioners to avoid all the complications that result from bad treatment. The advice given by Robert Jones has saved many a limb and he said that every practitioner should remember when he is handicapped for want of proper help to take this line of 'common-sense treatment'. Every practitioner should feel the radial pulse and watch the condition of the forearm and observe any nerve lesions at the time of each examination and should not attempt to set a fracture in acute flexion without reduction of the fragments and even after reduction watch the pulse while adjusting the flexion of the elbow at the time of setting of the fracture. The degree of flexion is entirely determined by the pulse at the wrist. This method of treatment is advocated only for general practitioners but not for the specialists and a specialist can adopt any method of treatment he likes provided he can aim at giving the patient at 100% functioning limb. Regarding the bad effects of massage he observed that this has been misunderstood. Massage of the effleurage type without hurting the patient is useful even before setting of the fracture to get

rid of oedema and it is certainly more useful, if done in the proper way under proper guidance after the fracture is set and united, in the restoration of function. Champoniere's dictum 'le mouvement est la vie' which means 'movement is life,' is applicable to any part of any injured limb and if done with care should result in restoration of function rather than in interference with it and the observations that massage is harmful is made from lack of personal knowledge of the science and art of massage. The members have probably thought that, when massage is ordered, the patient is handed over to the massuer (especially of the indigenous type) who does not understand the physiology and anatomy of the limb or the pathological condition at the time he starts the massage. "How many of the surgeons assembled in the hall," he asked, "are conversant with the methods of massage that is conducive to the restoration of function of a limb?" It is a pity that they are not acquainted with the efficacy of massage and he would commend every surgeon to be well acquainted with the scientific methods of massage. A well planned massage is of definite value and the speaker had definitely impressed in his remarks that active and *not* passive movements should be encouraged in the region of the elbow along with mild physio-therapeutic measures.

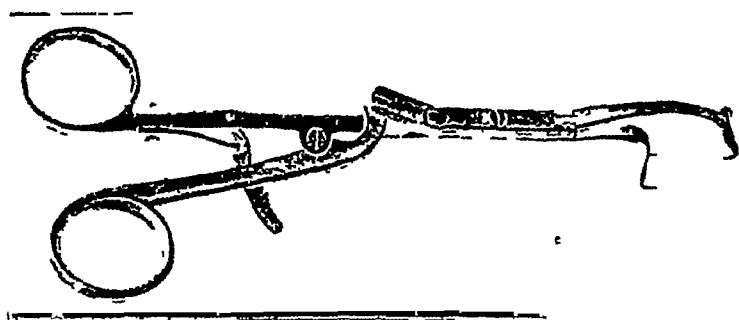
About Volkmann's ischaemic contracture he pointed out that he had only operated twice and in both cases he found the radial artery was contracted like a cord and resembled a nerve cord. In the first case, operation was done because Volkmann's ischaemia was feared. The limb was cold, the radial pulse was not felt and there was an enormous swelling with remarkable pain inspite of proper treatment. The result was a 100% restoration of function. It is difficult to give a time limit for operation, and waiting for the starting of ischaemia would be disastrous. It is better to anticipate trouble than to wait and see. In those cases where waiting had been done or where improper treatment had been given and advice sought late, operative results were not very encouraging. The signs of blue limb, disappearance of pulse and increase in pain are the guiding features for surgical interference in supra-condylar fractures to avoid Volkmann's ischaemic contracture.

The value of nerve transposition in the restoration of functional movements of the elbow was learned from practical experience. It is well known that the ulnar nerve may get stretched due to change in the alignment of the limb and the resultant protective spasm may interfere with the range of function. So, the triceps, the opposing muscle in flexion, may not relax and so also the flexors in extension. These observations are given to the members, should they find limitation of movements in cases of elbows which have been given sufficient time for recovery of function, to try this method and report the results of such transposition of the nerve. Capt Nigam's observation that he had found a forward dislocation of the head of the radius without an injury of the ulna is interesting and the case should be published as a very rare one. He observed that congenital dislocations have been observed without fractures of the upper third of the ulna. They have already been shown in the pictures and in the reprints. Regarding the observation of the value of taking X-ray pictures in the flexed position of the elbows pointed out by Dr Parmar, the lecturer promised that he would try and report the results of such a procedure. Regarding the nerve injuries, they did not occur as a result of the treatment by the lecturer, but were observed either in cases immediately after the injury or as a result of treatment. No case of nerve injury occurred as a result of treatment by the lecturer and these nerve injuries can be avoided if careful attention is paid in the treatment of these injuries. He observed that careful attention to detail is essential in the successful treatment of elbow injuries.

NEW INSTRUMENTS

" These Forceps have been designed to replace the usual form of Tetra Towel Forceps which closes in such a manner as to have the rings of the handles in a vertical position on the patient's abdomen

This is a great inconvenience to the Surgeon in that his suture frequently becomes entangled in the rings which are sticking up



The Forceps I have designed have the rings set to lie flat against the patient's abdomen when the Towel is fixed in position, thus eliminating the nuisance

They have been made for me in stainless steel by the Times Surgical Co of Sialkot I have used them daily for over a year now and find them a great advance in design and very satisfactory "

—A T ANDREASEN

USEFUL MEASURES IN THE TREATMENT OF PATIENTS SUBMITTED TO RADICAL GASTRIC RESECTION

BY

ROY COHN, M D & JOHN POOL, M D

FROM THE DEPARTMENT OF SURGERY,
OF THE TATA MEMORIAL HOSPITAL, BOMBAY

The exact frequency of carcinoma of the stomach is not known in India. In the United States in 1936 there were an estimated 27,000 deaths from carcinoma of the stomach, there is no reason to suppose that a proportional incidence does not prevail in India. Of the first 800 admissions to the Tata Memorial Hospital, there were 17 patients presenting with gastric problems. Of this number eight were submitted to surgery with only one death in the group. In only five was radical gastric resection possible.

Because of the relatively advanced stage of the disease with which these patients presented themselves, it was felt that successful therapy was in no small part attributable to the application of pre-operative and post-operative measures made available to surgeons through recent advances in the knowledge of physiology. Thus many patients formerly considered inoperable can now be placed in the operable group. As the prognosis of carcinoma of the stomach is hopeless without surgical resection, every patient which can be placed in the operable group represents a victory.

In 1933 Parsons (1) found that 20 per cent of patients surviving radical surgery were alive and well from five to nine years after operation. This figure is about the average for most clinics and has encouraged a definite trend to more radical surgery.

Nutrition

The most difficult problem in preparing patients with gastric disease for radical surgery is the depleted state of nutrition in which they are apt to present themselves. Of the seventeen patients in this group at the Tata Memorial Hospital, the average weight of the female patients was 81 pounds, and of the male patients, 96 pounds. The average duration of symptoms was 14 months.

It is almost impossible to supply nutrition in the presence of extensive gastric disease and pyloric obstruction. However, the patient can be given a temporary but considerable boost by parental methods in preparation for operation even though the caloric requirements cannot be replaced, because the body can obtain a large amount of energy by oxidizing its own tissues for a short period of time.

Vitamins

Vitamin A deficiency is seen clinically in mild forms of night blindness. This entity is more common than one might suppose. Corlette et al (2) recently reported that 50 per cent of a representative group of adults from a large clinic in the United States showed vision below normal standards by the photometer test. Keratinization in the ducts and epithelial cells is also a manifestation of vitamin A deficiency. Blackfan and Wolbach made smears from conjunctival scrapings which when stained showed the abnormal presence of cornified epithelial cells. Skin changes have also been described (3). These consist of keratotic papules of varying size. Unfortunately fish oils and other products which contain a large amount of vitamin A are not available in a commercially purified form for parenteral injection. The daily requirements amount to 20–30 USP units per kilogram of body weight. It is interesting to note that bile is essential to the absorption of carotene. Liquid petrolatum markedly diminishes the absorption of vitamin A.

The vitamin B complex, B₁, thiamin, B₂, riboflavin, and nicotinic acid, is intimately connected with the enzyme systems of the body and the oxidation of carbohydrates. About 200–400 international units are required daily. Yeasts and wheat germs contain large amounts of this complex. All our patients receive three milligrams of thiamin subcutaneously daily.

Vitamin C is the most easily synthesized of all the vitamins. It is of particular importance in wound healing as Lanman and Ingles, Wolbach, and others have shown. The body requires 28–100 milligrams daily. The larger dose subcutaneously administered is recommended daily pre-operatively, and post-operatively until the patient is eating well. The determination of the blood level of vitamin C is a simple colorimetric method and is of value in picking out the patients with subclinical scurvy.

Vitamin D and K are usually not depleted in stomach diseases unless there has been diarrhea or jaundice present (4, 5, 6).

Anemia

Anemia is frequently associated with all forms of nutritional disturbances. In addition to starvation patients with ulcerating lesions of the stomach are subjected to chronic blood loss and toxic absorption from the lesion. All our operated patients had red cell counts less than 3.5 million cells per cubic millimeter. During the preoperative and postoperative periods the patients are given 1 c.c. of concentrated liver extract every other day. Large doses of reduced iron are given daily by mouth. It is important to remember that the absorption of iron takes place poorly and if small doses are given, it can be almost quantitatively recovered in the stool. The particular form in which iron is given is not important. Reduced iron is the cheapest and simplest.

Blood transfusions, of course, are the simplest and quickest way of treating anemia. Besides the anemia, transfusions are the only method which we have to raise the plasma proteins. The use of purified amino acids intravenously has so far not proved feasible.

The importance of a normal plasma protein is very great. It not only causes delay in wound healing and the function of the gastric anastomoses (7) when the plasma protein level is below the approximate level of five grams per cent, but it also plays an important part in the retention of water especially in the sicker patients.

Frequently this failure of functioning of the anastomosis post-operatively may be interpreted as due to obstruction. And as Ravdin has pointed out, the fatal operation for the relief of the alleged obstruction may be avoided if the patient is aided by repeated blood transfusion. The presence of a normal blood count (10) does not rule out the necessity for a transfusion.

Dental Hygiene

The most important source of the bacteria in the stomach is from the mouth and teeth. When the teeth are particularly dirty, very virulent organisms may be present in the stomach. These may be responsible for a fatal peritonitis when the stomach is opened. This is especially true in patients with carcinoma of the stomach as they usually have a hypochlorhydria or achlorhydria so that the bacteria are not destroyed as in a patient with a normal gastric secretion. Therefore, it is very important to clean up the mouth by dental extractions and other methods when necessary before the major procedure is undertaken.

Nasal Tube

If it is possible to pass a tube into the duodenum preoperatively feedings may be carried out through the tube as a sort of jejunostomy. This is a difficult procedure as the bulb of the Miller Abbot tube is quite large. And if obstruction is present at the pylorus, it is impossible. The most important function of the tube is to allow mechanical cleansing of the stomach by constant lavage in the few days immediately preceding the operation. Horsley has advised 0.25—0.5 per cent hydrochloric acid for this purpose. The mechanical cleansing rather than the chemical sterilising of the stomach contents seems to be the important factor.

Post-operatively the tube keeps the stomach and upper bowel empty of swallowed air and secretions thus preventing distention, which, as Wangensteen has so ably shown, delays resumption of peristalsis and aids in the spread of infection. In addition by the character of the nasal drainage, one can detect the early presence of haemorrhage from the suture line. Further, it prevents post-operative nausea and vomiting. It is customary to

attach some gentle form of suction to the nasal tube. This is usually done simplest by any form of water siphonage.

The time of removal of the stomach tube is determined by the amount of drainage from it, the resumption of peristalsis as determined by the auscultation of the abdomen and the passage of flatus. Generally, these occur on the third or fourth day. The amount of drainage from the tube is the most important factor as it also gives one some idea of the functioning of the anastomosis. Ordinarily the stomach will secrete two or three litres of fluid in twenty four hours. If there is a complete obstruction, this entire amount will be drained out. If the anastomosis is functioning satisfactorily only a few c c will drain out.

Although all our abdominal operated cases receive nothing by mouth the first post-operative day, the patient can be allowed to swallow liquids with the tube in place. If obstruction is present, the liquid will be drained off.

The constant presence of a stomach tube through the nose is not without danger, of course. Patients have developed nasopharyngeal inflammation followed by stenosis due to the long presence of an inlying tube. Others have developed an alkalosis from the constant loss of the stomach acid. It is therefore important to keep the nose and mouth clean and moist. A few drops of mineral oil in the nose daily helps the comfort of the patient. It is also important to use a small calibre tube.

Anaesthesia

This important question has advanced rapidly in recent years. With the development of the closed methods of anaesthesia and the newer gases such as cyclopropane, much smaller quantities of anaesthetic agent combined with much higher percentages of oxygen can be used.

Local anaesthesia in the form of 0.5 per cent novocaine is used liberally into the peritoneum. A splanchnic block as recommended by Finsterer is also of value. About 50—70 c c of solution are injected into the area over the vertebrae between the aorta and the vena cava. Care should be taken that a large vessel is not injured during this procedure.

Sulphanilamide

After the operation has been completed and before closing the peritoneal cavity, ten grams of sulphanilamide in saline are placed in the peritoneal cavity in the stomach bed. This suggestion which was advanced by Hudson (8) appears to be an excellent one. We have had no cases of peritonitis in our small series and only one minor wound infection in a patient who had had a resection and sulphanilamide was not used. We have had no

reactions to the use of this large dose of the drug Hudson had shown that peritonitis from faecal contamination was entirely prevented by this method

Pulmonary Complications

Following the operation, the residual anaesthetic agents are washed out by carbon dioxide inhalations Beecher has shown that after every upper abdominal laparotomy, there is a decrease in the tidal volume of air This is caused by the poor ventilation of the bases of the lungs due to splinting of the accessory muscles of respiration Atelectasis and bronchopneumonia may follow Care is taken to have the patients in high Fowler's position, and to turn them frequently in bed The respirations must not be depressed by the too free use of morphine

If atelectasis does develop as Haight has shown, a catheter inserted without anaesthesia into the major bronchi with the aspiration of the mucus plugs may be a life saving procedure

An oxygen tent or intranasal oxygen post-operatively is also of importance in preventing cyanosis and anoxemia until the patient has recovered sufficient strength to cough out his own secretion Care should be taken to avoid restricting the movements of the thoracic cage by adhesive strapping or bindings

Fluid Balance

The loss of fluid in the form of blood and evaporation from the lungs and skin and wound surfaces is much greater than one would expect Careful studies at the Mayo Clinic, the Massachusetts General Hospital, and the Pondeville Hospital, have shown that the blood loss even from a comparatively dry operation such as a hernia averages about 150 c c In a radical mastectomy, an average of 800 c c was lost, and in some intracranial meningiomata as much as 1 500 c c of blood was lost The best treatment of shock from blood loss is transfusion before it occurs This is done by inserting a cannula into an ankle vein and allowing the blood to drip in during operation just like an ordinary intravenous The blood can be alternated with glucose solution and the rate controlled by the needs

The water loss, obviously, would be higher in hot countries than in more temperate countries We have found it necessary to give about 3,000 c c of 5 per cent glucose in saline daily in the first few post-operative days

The necessary amount of fluid to be replaced is estimated as follows and on the basis of studies by Collier and Maddock, Gamble, Stewart (9, 10) and others Chemical studies have shown that about 1,500 c c of water is lost by evaporation from the skin and lungs An additional 1,500 c c is the approximate amount of water which is required by the kidneys to secrete the

bodily wastes at a normal specific gravity. In addition one must add to these figures, the amount of fluid lost by vomitus, nasal tube suction, or other forms of drainage, and the urinary output.

If more than 3,000 c c are to be replaced five per cent glucose in distilled water should be used instead of five per cent glucose in saline. If the blood level of the sodium ion becomes high, water retention develops. If the plasma protein is also low, one may precipitate an acute pulmonary edema and actually drown the patient. A high chloride level also causes the patient to be terribly thirsty in spite of the amount of fluid replaced.

Care must also be taken to reduce the total amount of fluid in patients with heart disease or renal disease. Hypodermoclyses are preferable to the intravenous route in patients with these complications but very often these are so slow in absorption that a sufficient amount of fluid cannot be given. Therefore, the intravenous route when used should not be faster than five c c per minute.

Post-Operative Feedings

The real opportunity to restore the normal nutritional state of the body comes once the growth has been removed and the anastomosis is functioning satisfactorily. Once peristalsis has been re-established the feedings can be rapidly advanced. One must be sure that the feedings are frequent but that the volume at any one time is small. After a period of a few months, the stump of the stomach will dilate considerably and eventually the patient can end up with as few as six feedings a day or less.

Occasionally, a patient will be encountered who will vomit liquid feedings or soft feedings but who will straighten out at once when solid food is given. In other patients, one may find it necessary to change the position of the patient in bed while eating in order to make the anastomosis work.

Whether radical gastric resection leads to the development of anemia post-operatively has not been definitely settled. (12, 13) Petri et al in dogs reported that the removal of the fundus led to a slight anemia, of slow evolution, which disappeared in two to three months. Removal of the pylorus and entire duodenum produces progressive grave, hypochromic anemia. Removal of the pylorus and the region of the duodenum containing Brunner's glands provokes slowly hypochromic anemia with a discrete tendency towards polycythemia or hyperchromic anemia without megalocytes. Bachrach and Fogelson removed gastric tissue well beyond the limits of the pyloric glands with none of the dogs operated upon showing evidence of pernicious anemia. Particularly strong evidence against the gastric theory is brought up by findings that extracts of other parts of the gastro intestinal tract contain a similar antianaemic factor as the stomach. Uotila found that the small intestine had more antianaemic factor than the stomach. In any

event, to be on the safe side clinically, one ought to place all post-operative radical gastric resections on a high caloric, high vitamin diet with intramuscular liver concentrate three times weekly as well as large doses of iron by mouth. This regimen should be continued for about three months. The red cell count should be checked every two months for the first year.

The following four illustrative cases with photographs of the specimens removed are reported.

CASE No 1—TMH 538

A Hindu male of 38 reported June 20, 1941, with a complaint of pain in the epigastrium of two years' duration. The pain had been relieved by food at first. Then it became constant. For the last two months, he had relieved himself by vomiting daily. He had lost considerable weight and strength. He had never vomited blood nor had tarry stools. Physical examination showed a weak looking man weighing 103 pounds. His teeth were in bad condition. In the epigastrium there was a firm hard mass which moved with respiration. Rectal examination was negative. The red cell count was 2.78 million, Hgb 52%, white count 10,800, urine negative, Kahn negative. Gastric analysis with the alcohol test meal showed free acid in all specimens, the highest being 22 degrees. X-Ray examination of the stomach by Dr K. P. Mody showed a filling defect in the lower third of the stomach typical of cancer.

The patient's teeth were cleaned up, the infected teeth being extracted. His stomach was lavaged daily with large amounts of saline. He was given a daily intravenous of five per cent glucose and saline, as well as subcutaneous liver, thiamin, and ascorbic acid.

Under regional novacaine block and intratracheal nitrous oxide, oxygen ether anaesthesia by Dr B. N. Sircar, a radical gastric resection was done leaving only 4–5 cm of the fundus of the stomach. A posterior Polya anastomosis was then performed. During the operation the patient received 500 cc of blood and 1,000 cc of glucose in saline intravenously. Following the operation a second transfusion of 500 cc of blood was given. Before closing the peritoneal cavity 10 gm of sulphanilamide were placed in the upper abdomen.

The patient's abdomen remained soft but on the second day his temperature rose to 104°F. Rales and dullness was found at both bases. A catheter was passed into the trachea and the bronchi aspirated, large amounts of mucus being removed. The patient was then given intranasal oxygen. By the third day he was able to cough up thick yellow sputum himself. As peristalsis had now started and the nasal tube had drained very little, it was removed. He had been receiving 3,000 cc of glucose in saline daily but this was now halved. The pulmonary complication slowly cleared up, with sulphapyridine given for seven consecutive days.

The patient was discharged well after twenty four days in the Hospital.

The pathological report by Dr V. R. Khanolkar showed a section of stomach and duodenum 20 X 16 cm. in which was situated a larger ulcer 15 X 9 cm. Fifteen nodes were included with the specimen which microscopically was a very anaplastic carcinoma of the stomach. Only two of the nodes showed evidence of metastases (Fig 1).

CASE No 2—TMH 726

A Goanese woman of 53 entered the Hospital July 30, 1941, with a complaint of heart burn, bloating, and abdominal distention of six months' duration. There was a post prandial sense of fullness with occasional griping pains. She had been treated medically for four months without relief. Physical examination showed a small dehydrated female weighing 72 pounds. A fixed hard non-tender mass was found just to the right of the midline in the epigastrium. Urine and Kahn test were negative. Red count 4.27 (dehydration), Hgb 76, Wbc 3,550, Plasma chlorides 556 mgm per cent, blood sugar 125 mgm per cent, plasma protein 5.9 gm. per cent, npn 19 mg per cent. A gastric analysis showed 90 cc fasting residue with free acid the highest being 16 degrees. An X-ray examination by Dr. L. H. Athle showed a large filling defect at the pylorus of the stomach typical of carcinoma.

The patient's dehydration was relieved by daily intravenouses. The stomach was washed and kept empty three days before the operation. Parenteral vitamins and liver were given.

Under general anaesthesia by Dr. Sircar a radical gastric resection with a Polya anastomosis was done.

The patient did remarkably well post-operatively and aside from one reading of 101°F, her temperature never exceeded 99°. Two transfusions were given, and 3,000 cc of glucose in saline daily for five days. The nasal tube was removed on the third day.

The patient was discharged well on the 19th post-operative day.

The examination of the specimen showed a prepyloric non-ulcerated tumour on the lesser curvature, extending to duodenum submucously, with metastasis to adjacent nodes in the hepato-duodenal ligament. The Microscopic report was adenocarcinoma, grade III.

CASE No 3—TMH 620

An Anglo-Indian male of 33 entered the Hospital July 11, 1941, with a complaint of epigastric distress of 17 years' duration. The patient's difficulties had begun with a typical ulcer history many years before. After having no success with various medical regimes, a posterior gastroenterostomy was done in 1930 at another hospital. He remained well for three to four years after this but then all his old symptoms returned with pain of a severe cramp like nature as well. He had been slowly going down hill as the attacks were becoming more frequent. Physical examination showed a man over six feet tall who weighed only 114 pounds. Aside from the old scar and some tenderness to the left of it, his physical examination was not remarkable. Urine and Kahn tests were negative. There was no occult blood in the stool. The red count was 3.38, Hgb 72, white count 4,000. There were 100 cc fasting residue in the stomach. All specimens showed high acid, the highest being 62 degrees. A barium examination of the stomach (Fig 4) showed the old anastomosis high on the stomach, a dilated stomach with pyloric obstruction, and a puddling of the barium in loops below the stomach. These findings were interpreted to mean pyloric obstruction, marginal ulceration with obstruction of the gastroenterostomy stoma, and chronic obstruction and dilatation of the duodenum.

This was the state of events at laparotomy, the marginal ulcer was found perforating into the outer walls of the transverse colon. The stomach, pylorus, gastroenterostomy with its section of jejunum and marginal ulcer were resected and a posterior Polya anastomosis left.

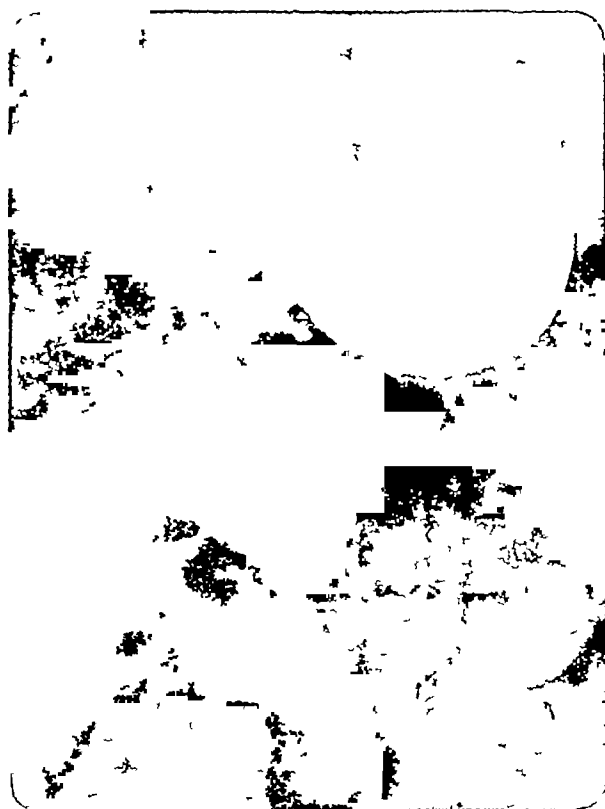


Fig 4 Case III

Three transfusions and 3,000 c.c. of fluid were given during the next twenty-four hours. During this time the patient lost 2,600 c.c. of blood-stained fluid by the nasal tube. During the next twenty-four hours the patient lost 560 c.c. of blood-stained fluid by nasal tube. On the third day 300 c.c. of bile-stained fluid drained. By this time peristalsis could be heard and as the patient found the tube very uncomfortable it was removed.



Fig 5 Case III

That night he vomited 300 cc of bile stained fluid and the tube was replaced removing 300 cc more. The 30 cc of water which had been permitted each hour the day before was stopped. The tube was left in forty-eight hours longer during which time it drained practically nothing. It was then again removed. The patient rapidly handled all his fluids by mouth and began eating solids on the tenth post-operative day. Iron was started by mouth and liver concentrate with vitamin C given daily subcutaneously. The patient was discharged on the twentieth post-operative day on a high caloric, high vitamin, six meal bland diet.

The specimen (Fig 5) showed the old duodenal ulcer scar, and the markedly constricted opening of the gastroenterostomy with a marked jejunitis in its walls.

CASE No 4—TMH 680

An Anglo-Indian woman of 74 was admitted July 22, 1941, with a three months' story of vomiting. The vomiting occurred almost immediately after eating and was often bloody. She had lost considerable weight and strength but at no time had had any pain. Physical examination showed a little old lady weighing 95 lbs. A few root fragments were present in her mouth. BP 170—100. In the area just under the left costal margin there was a round hard mass which moved with respiration. Urine and Kahn tests were negative. Red count 3.43 million, Hgb 62, white blood count 8,850. No free acid on gastric analysis. A gastro-intestinal X-ray showed a large bulky carcinoma of the fundus of the stomach.

The root fragments were removed. Then an oesophagoscopy was done. The obstruction could be seen blocking the oesophagus 36 cm from the gum margins but a biopsy at this area showed no disease. A transfusion was given the day before operation in addition to the usual parenteral vitamins.

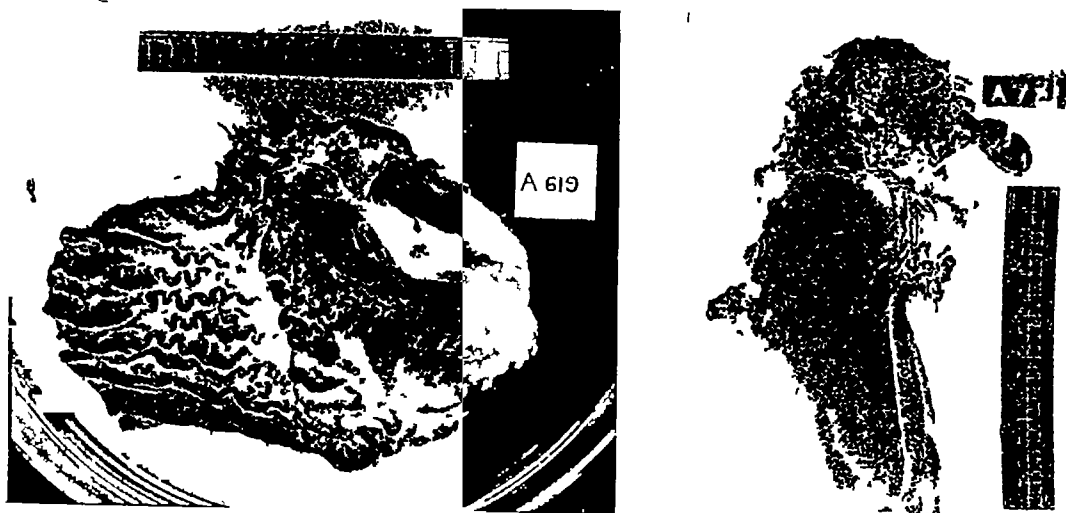


Fig 6 Case IV

Under intratracheal anaesthesia, through the bed of the eighth rib and diaphragm, the stomach and distal 2 cm. of the oesophagus were resected 10 gm of sulphanilamide was left in the bed surrounding the oesophago-jejunostomy Two transfusions were given during the operation and one more the day after operation

Unfortunately the patient did not survive the procedure and died on the third day with signs of broncho-pneumonia Intratracheal catheterization was performed

At autopsy (Dr Gharpure) the abdomen was found to be clean with the various suture lines intact The major bronchi were filled with thick tenacious pus and both lower lobes showed broncho-pneumonia.

This patient's age might have been considered to place her in the inoperable group However, since the choice lay between allowing the patient to die of starvation or take the risk of the operation with its small chance of success, the latter seemed the lesser of the two evils

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Visits to Clinics

UNITED STATES OF AMERICA

BY

LT-COL K G PANDALAI, FRCS, IMS (RETD)

A study tour in the United States could not be considered complete without a visit to the renowned Johns Hopkin's Hospital and Medical College at Baltimore, which owes its reputation in the East principally as being the centre of a University of the same name. Baltimore is a harbour town on the east coast of America about 60 miles north of Washington. In size it is not as large as Madras, but several Ocean-going Steamers call here and in many ways it has distinctive features of its own. To us from India, it was perhaps the first city where we had actual experience of the subtle differences between the culture of the North and South of the United States. These will be referred to later in the course of this paper. For the present, I was filled with joy at being in a position to make personal contacts with some of the illustrious leaders of Surgery whose names have been cherished by hundreds of Medical men all over the world. We arrived here by a late train from Philadelphia and, having made our home at the centrally situated Lord Baltimore Hotel, I made inquiries and discovered that some interesting work could be seen next morning.

As elsewhere in America, clinical work begins at 8 A.M. much the same as in India. Fortunately for one, the days' programme of operations is announced the previous evening and could be ascertained by phone enquiry at the Hospital Office counter. After an early breakfast and riding in one of the yellow Taxicabs seen everywhere, it was easy for me to reach the hospital in time to see the surgical work of Prof. Dandy, the great Neurological Surgeon who happened to have some interesting cases posted for the morning. On arrival I felt impressed to see in the main entrance Hall of the hospital a large Marble Statue of Christ and on the walls were inscribed the names of the various donors who had contributed to the Institution. The girl at the Information Counter gave exact instructions for finding the person I was seeking and after a good deal of losing one's way, I found myself in the gallery of an Operation Theatre watching Prof. Dandy, the great Brain Surgeon remove a Pituitary Tumour. He used the Fronto-parietal approach and after turning down a large osteo-plastic flap and incising the dura in a short time demonstrated an adenomatous mass filling the Pituitary fossa. This he carefully curetted and after haemostasis with plugs of wool supplemented by diathermy, left the closure of the dura and skull to the Assistant. Sitting

in the gallery it all seemed so easy Towards the close of the operation, I announced myself as a visitor from India and was invited thereafter to see at close quarters a good deal of work done on other parts of the Brain on other days, so that in the course of my brief visit I had the good fortune to see among others such rare cases as removal of the Pineal body, Meniere's disease cured by division of the 8th Cranial Nerve, Trigeminal Neuralgia cured by division of the Sensory root by the posterior approach (Dandy's method), etc

To a visitor from the East where work of this description is rare, the impression produced was one of wonder at the ease with which it was possible to obtain these successful results and when it is remembered that delicate and complicated manipulations within the brain are matters of daily occurrence in this and other Institutions which I visited, I could not but feel the distance that separates India from the front rank countries of the world, in matters pertaining to Medical and Surgical progress

Dandy was not the youthful personality I had pictured from a perusal of his writings He was about 60 but carried his years remarkably well A man of medium height and full of vigour he spoke very little but in action was quick eyed and sure He impresses one as a man of great ideas and quick execution

Johns Hopkin's is a Hospital of over 1,000 beds and has a large paying section Among the several famous men who are attached to this Hospital is Dr Young, one of the leading Genito-urinary Surgeons of the world, whose name is familiar in India It was he who popularised the well-known operation of perineal prostatectomy for enlargement of the prostate This operation is not done very much in India where the Suprapubic enucleation is more popular, but when one watches Young, who is not young (he had turned 75, when I was visiting in 1938), carry through case after case in the course of the morning with that delicacy of touch which comes through long experience, one cannot but feel that this operation in the hands of the expert has a definite place in suitable cases

Although Johns Hopkin's is the largest and best known among the Hospitals of Baltimore, it is not the only one Almost next door to Johns Hopkin's stands a smaller and newer Institution with 285 beds, the Sinai Hospital This is housed in a beautiful building with airy wards and has fine Operation Theatres This is a teaching Hospital under the Maryland State University and is maintained out of public funds

Another noteworthy Institution here is the Union Memorial Hospital with about 400 beds On entering the reception room one notices a portrait of Finney, the famous abdominal Surgeon, after whom the operation of Gastro-duodenostomy is known Although 75 years old he was still attached to the Hospital, but happened to be away when I was visiting I was told

that his two sons have taken after the parent and are also Surgeons in the same Institution. Another noted member of the staff of this Hospital is Mr J S Davis, the plastic Surgeon whose book on plastic Surgery is a well-known classic on the subject.

I was taken round this Hospital by the Resident Surgeon who made keen inquiries about the State of medical work in India and possibilities for a Surgeon from America. When I informed him that Hospitals in India are few and comparatively poorly staffed and equipped and that life in an Institution here meant besides fighting the inhospitable climate frequent skirmishes with the Administration to obtain essential requirements, he realised that India was not the land of legendary wealth and plenty that it is reputed to be.

Yet another Hospital we visited was the Maryland University Hospital of 405 beds. This is housed in a modern building of 7 floors and is designed in the shape of a +. The Sister in charge of the floor sits in the centre and controls the working of the entire floor. This Institution is maintained by the University which is financed by the State. Work of a high quality is carried on. It has several Operation Theatres and Departments for the treatment of special diseases. There is a special laboratory for blood grouping with a house Surgeon in charge of it and at the time of my visit a little child of 9 months was receiving a blood transfusion. The staff is large, with 44 Interns and a visiting staff of 160 Doctors. This is a teaching Hospital under the sole control of the University.

As was mentioned earlier, in this town of Baltimore, I noticed the existence of differential treatment of coloured as distinct from white people. In Hospitals, separate entrances are provided for white and coloured people, with separate waiting rooms, wards and lavatories. Such discrimination had not been observed by us in any form in the States through which we had hitherto passed in the northern half of America, but as we went south, this began to manifest itself. Although used to prejudices of this nature in our own country, we were not a little surprised at its presence in a land which we had thought was the home of equality for all, but fortunately we escaped being victims of such prejudices during our short stay in their midst.

Apart from these drawbacks, our lives were made pleasant by the further opportunities given to us to make social contacts with the elite of the town. We had introductions to a leading Gentleman of the town, who had once served in the State Diplomatic Service, and were invited to dinner with his family. The latter had several medical connections and we felt quite at home. Our host had intimate knowledge of the people and conditions in Mexico and Central America, and entertained us with anecdotes of his life in those strange places. He told us especially about the Yucatan Peninsula from where he had brought various specimens of an ancient and dead civilisation.

sation named 'Maya' whose relics were being dug up along the shores of the Carribbean Sea This civilisation is said to be at least 3,000 years old and their hieroglyphics have not yet been thoroughly deciphered up to the present time The interest of the average American in matters Indian is very keen and there generally is a wide recognition of the old glories of the past history of our country and much sympathy with the nationalistic aims and aspirations of our people, but there is also a volume of feeling which sympathises with the alleged difficulties of the rulers in meeting the wishes of the ruled

New York, which is one of the greatest cities in the world for its wealth and population has many large Hospitals well-worth a visit Many eminent names with which we are conversant have been associated with New York Hospitals, but to a visitor, the city is so large and public conveyances and streets so crowded that a great deal of working time is lost in going from place to place and it is not possible in New York in the course of a short working day to see as much as one can in a smaller town in the Districts However, I paid short visits to a few of the leading Medical Institutions of the City As is well known New York has 2 principal University Centres, Viz, the Cornell and Columbia University Centres Each has Medical Schools and Hospitals attached to it and I was able to pay flying visits to some of them The Hospitals are housed in very fine multi floored buildings with elaborate equipment and a large staff The wards unlike in India are small and each bed could be curtained off as required by an arrangement of moveable curtains on rings The Theatres are lined by coloured tiles which give an impression of comfort to the eye as distinct from the painful white glare so universal in India Moreover most Operation Theatres are air-conditioned During operations, use is made of very elaborate apparatus, for anaesthesia Gaseous anaesthesia of all kinds is in common use and except in certain centres the anaesthetists are graduate Nurses who have undergone special training in their subject During operations silk is used a great deal both for skin and for deep ligatures, catgut being reserved for special situations like gut and the peritoneum

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The Fourth Annual Conference will be held at the Medical College, Calcutta, from 10 A M on the 21st of October, 1941 All members are requested to attend The following are the subjects for discussion —

1. **Surgical Treatment of Pulmonary Tuberculosis**
Opened by Rai Bahadur G D Kapur of Lahore
2. **Surgical Aspects of Filariasis**
Opened by U P Sinha of Patna
3. **Surgery of the Thyroid**
Opened by Lt-Col K G Pandalar of Madras

Members intending to attend the Conference are requested to communicate with Dr Panchanan Chatterjee, M B (Cal), F R C S, 32/13-A, Beadon Street, Calcutta, immediately

* * * * *

Foundation Members who have not yet sent in their photographs are again reminded to do so at an early date (a small passport size photograph recently taken will meet the requirements)

The following are the subjects for discussion in the next three years —

- | | | |
|------|---|------------------------------------|
| 1942 | 1 | Laryngeal Carcinoma |
| | 2 | Injuries of the Thorax |
| 1943 | 1 | Traumatic Surgery of the Skull |
| | 2 | Carcinoma of the Breast |
| | 3 | Urinary Lithiasis |
| 1944 | 1 | Carcinoma of the Rectum |
| | 2 | Enlarged Prostate |
| | 3 | Fractures of the neck of the Femur |

Association of Surgeons of India

PRIZE ESSAY ON "INFECTIONS OF THE FOOT"

The Association of Surgeons of India offers an annual prize of the value of Rs 150 to the best essay based on original work on a subject to be decided by the Governing Body of the Association and announced every year

The following are the conditions of the award —

1 The competition is open to all qualified medical practitioners registered in India, who have been in practice for not more than 10 years after qualification

2 The essay should be based on original work and should be written in English

3 It should be type-written on one side of the paper only and should not contain the name or other indication of the identity of the competitor Four copies should be submitted

4 The name, address and qualifications, however, should be written on a separate sheet of paper and enclosed with the essay

5 The subject for 1942 is "**Infections of the Foot**" and the essay should reach the Secretary before the 1st October 1942

6 The copyright for the winning essay will remain with the Association of Surgeons of India and will be published in the Indian Journal of Surgery Other essays will be returned to the senders if accompanied by stamped addressed envelopes

7 The Governing Body may at its discretion withhold the prize if the essays submitted do not come up to the standard

8 All communications regarding the above are to be addressed to the Secretary, Association of Surgeons of India, Binfield, Kilpauk, Madras

C P V MENON,

Hony Secretary

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DECEMBER 1941

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वात मूत्र पुरीषाणि क्रिमयः शुक्लमेव च ।
भगन्दरात् प्रस्रवन्ति यस्य तं परिवर्जयेत् ॥ ११ ॥
सुश्रुत व्याख्यायं सूत्रस्थाने त्रयस्त्रिंशत्तमोऽध्यायः ॥

*He should be avoided through whose fistula (in ano) wind,
urine, faeces, worms or semen is passed out*


—SUSHRUTA SAMHITA, SUTRASTHĀNA,
Thirty-third Chapter, XI Verse

EDITORIAL

The Editors have pleasure in sending their hearty greetings and best wishes to the Members and friends of the Association for a happy New Year and trust the Journal would continue to receive their unstinting support as in previous years

The most important event of the year was the Annual Conference of the Association of Surgeons which met at the Medical College in Calcutta on 21st, 22nd and 23rd October, 1941. This was a noteworthy Session for the Surgeons of India, not only by the value of the results achieved but also by the opening up of prospects of marked accession of strength and influence in future. Great enthusiasm prevailed and many Surgeons of Calcutta joined the Association as New Members. Practitioners of all specialities co-operated heartily to make the occasion a success. The Professional Meetings and Social functions were well-attended. Among the latter, the most enjoyable was the trip on the Hoogly to the Botanical Gardens and we have no doubt that all those who had the good fortune to attend this Session would always cherish the occasion with pleasant memories.

Surgical lesions caused by Guinea-worm infection are common in different parts of the country and most Surgeons have personally handled cases of the kind. It would, therefore, interest them to read an illuminating contribution to the study of the life history of the Guinea-worm which appears in the current issue of the Journal. This paper is based on research work carried out by the Author over many years and throws light on many points in the life history of the parasite which have not hitherto been worked out.

Readers of the Journal have no doubt developed an attachment to the familiar design of the Swastik on the wrapper of the Journal and a few have wondered what its special significance might be. The design is the well-known 'Swastik'  of our Ancients and signifies 'well-being' of humanity, the Cobras are the Guardians and within the Swastik is the motto 'We Serve' in Sanskrit.

LIFE HISTORY OF *DRACUNCULUS MEDINENSIS**

BY

DR V N MOORTHY, B SC, M B, B S, D P H, D T M, DR P H (JOHNS HOPKINS),
DEPARTMENT OF PUBLIC HEALTH, BANGALORE

Till a few years ago, when it became possible to experimentally induce *Dracunculus* infection in a series of dogs, the life history of *Dracunculus medinensis* was based mainly on the epidemiological and other observations made in the infected areas. Although it has now become possible to obtain some experimental evidence, there are still many gaps in the life history studies of this parasite, for which it has not yet become possible to obtain satisfactory experimental evidence. It is however proposed to present in this paper a general outline of the possible life history of this parasite in the light of the recent experimental evidence that has been obtained.

Historical Outline—Based on the similarity of the larvae of *Dracunculus* and *Camallanus*, Leuckart (1856) suggested to Fedtchenko to determine whether *Dracunculus* larvae also underwent in cyclops a metamorphosis similar to that of the larvae of *Camallanus lacustris*. This led to the most interesting discovery of Fedtchenko (1871) by which he was able to indicate that the transmission of dracontiasis from man to man took place through the medium of cyclops. In many respects this is one of the most outstanding discoveries in the history of parasitology since it was the first step in the establishment of the vast amount of knowledge we now possess regarding the transmission of parasitic diseases by arthropod hosts.

In spite of the fact that the mode of Guinea-worm transmission has been known for over 60 years, many of the details of how the infection actually occurs and how the adults become fertilized had, up to a few years ago, defied all the efforts of investigators. Having followed the growth of the *Dracunculus* larva in cyclops until the fourth week Fedtchenko (1871) attempted to complete the life cycle of the parasite by feeding cats and dogs with the infected cyclops, but all his experiments were unsuccessful. Nevertheless with his illuminating intuition he concluded that cyclops was undoubtedly the efficient intermediate host and that probably the larvae

*Some of the material presented in this paper has been taken from the thesis submitted by the writer for the Doctor of Public Health degree of the Johns Hopkins University, Baltimore (Md).

The writer wishes to express his deep sense of gratitude for the ready help, encouragement and active co-operation given by Dr W C Sweet, with whose collaboration several of the publications referred to in this paper were published and also to Dr W W Cort, of the Johns Hopkins School of Hygiene and Public Health, Baltimore (Md) for very valuable help and suggestions given while doing this work,

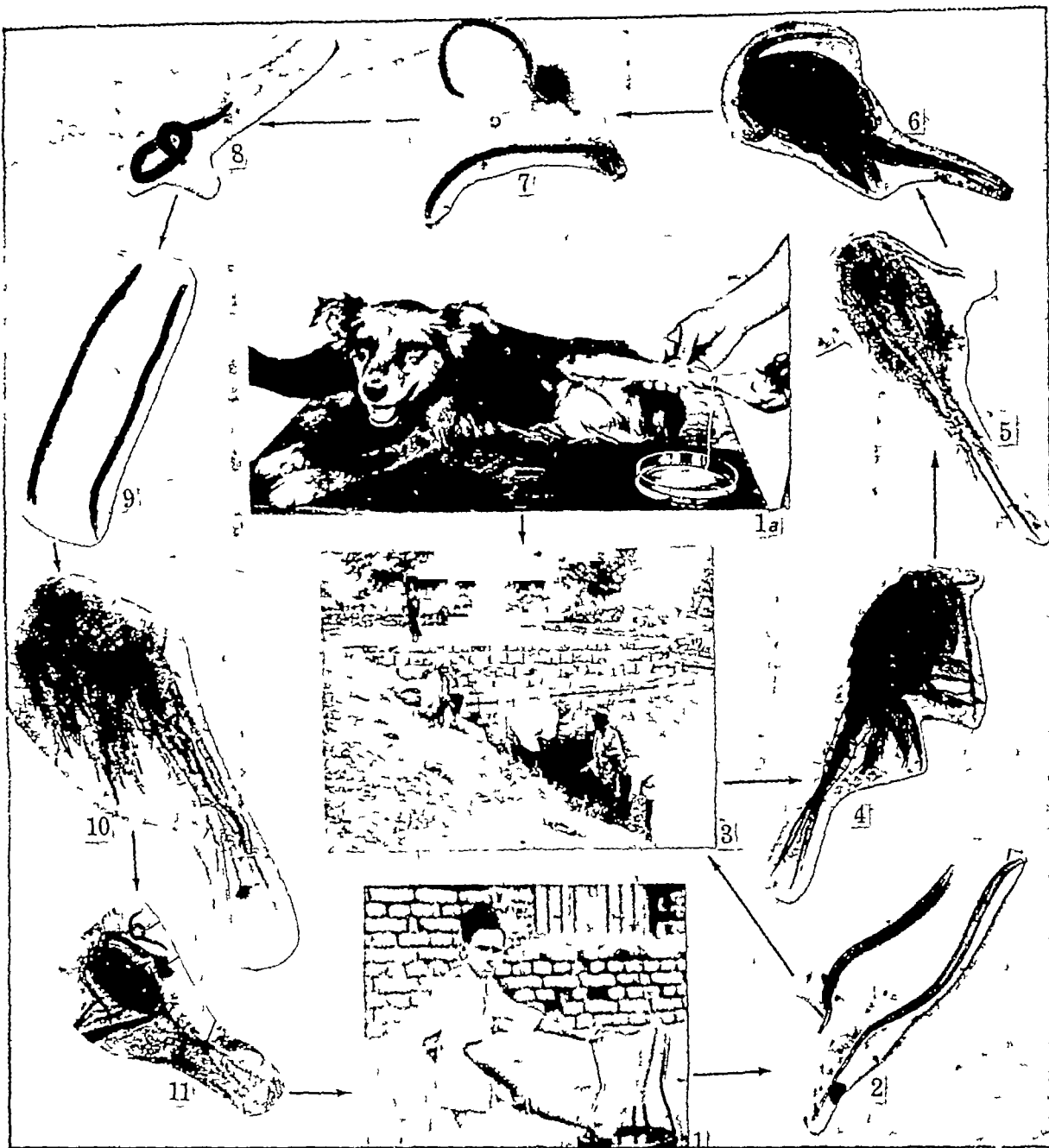
were taken into the alimentary canal of man while still within this host and then set free. His view was that in the intestines the larvae attained sexual maturity and that the females, when fertilized, made their way into the connective tissues, while the males died and were discharged in the faeces.

The failure of Fedtchenko's efforts to produce infection experimentally led many to doubt the accuracy of his conclusions until Leiper (1907) succeeded in transmitting the infection to monkeys by feeding them with infected cyclops. Liston (1914), Fairley & Liston (1924), and a few others who repeated Leiper's work were unable to induce infection in monkeys of the species *Maccus sinicus* and concluded that this species was refractory to *Dracunculus* infection. The next real advance in the life history was made when Issajev (1934) succeeded in inducing infection in a number of dogs by feeding them with infected cyclops and obtained from them large numbers of mature females of *Dracunculus medinensis*. But Issajev (1934) also failed to obtain the males and the stages of the females earlier than about 6 months after infection. In the series of experimental infections of dogs with *Dracunculus medinensis* carried out by Dr W C Sweet and the writer, it was found possible to induce infection in a number of dogs and to secure from them both males and females at different stages of development from 67 to 457 days after infection. Detailed descriptions of the different stages of the parasite, both males as well as females and the various developmental changes they undergo both in the intermediate as well as in the definitive host, have already been given in a series of publications (Moorthy 1937, 1938, Moorthy & Sweet 1936 a, 1936 b, and 1938). Based on the observations made while conducting these experiments the following brief outline of the possible life history of *Dracunculus medinensis* is suggested. Should there be any fresh opportunity for work on this problem it is hoped to obtain the necessary experimental evidence, to bridge up the still missing links in the life chain of this parasite.

Possible life history of Dracunculus medinensis—In an infected area early cases of dracontiasis presumably in the blister stage (Fig 1) are the main source of infection. For the transference of the infection from the infected to the healthy the presence of suitable species of cyclops in a source of drinking water to which the fresh *Guinea-worm* larvae can easily gain access from an infected individual, like a stepwell (Fig 3) pond or a tank also seems essential. When the fresh first stage larvae both types A and B (Fig 2)* Moorthy 1938 and Moorthy & Sweet 1936 d) are set free into the water by the adult female worm, the cyclops ingests the larvae (Fig 4) which, about 2 to 8 hours later, pierce the intestines of the cyclops (Fig 5) and reach its body cavity (Fig 6) where they undergo further development. In

*Type B is the common type of larva found in large numbers in the uteri of the mature, adult *Dracunculus medinensis*. Type A is the unusual form found in comparatively smaller numbers along with type B in the same worm.

PLATE I

Pictorial Representation of the Life History of *Dracunculus Medinensis*

EXPLANATION OF THE TEXT FIGURES

- Fig 1 Guinea-worm patient—blister stage (Moorthy, 1938)
- „ 1a One of the dogs that developed dracontiasis about a year after experimental infection
- „ 2 Photomicrograph of the first stage guinea-worm larvae—Type A & B (Moorthy & Sweet, 1936d)

- Fig 3 One of the infected step-wells in the Chitaldrug District, Mysore State, South India
- „ 4 Photomicrograph of cyclops just ingesting the guinea-worm larvae, per os
- „ 5 Photomicrograph of an infected cyclops—the guinea-worm larvae is seen in its intestines
- „ 6 Photomicrograph of an infected cyclops—the guinea-worm larvae have pierced the intestines of cyclops and are seen lying in its body cavity
- „ 7 Photomicrograph of the guinea-worm larvae (Type A & B) just undergoing the first moult in the body cavity of cyclops
- „ 8 Photomicrograph of the guinea-worm larvae just undergoing the second moult in the body cavity of cyclops
- „ 9 Photomicrograph of the guinea-worm larvae (Type A & B) after completing the second moult in the body cavity of cyclops, i.e., the infective stage of the larvae
- „ 10 Photomicrograph of infected cyclops treated with bile—the infective stage of the larvae is seen just escaping from the body cavity of cyclops (Moorthy, 1935)
- „ 11 Photomicrograph of infected cyclops treated with bile—the infective stage of the guinea-worm larvae is seen being released from cyclops and lying by its side (Moorthy, 1935)

the Chitaldrug district, Mysore State, South India, *Mesocyclops leuckarti*, and *Meso-cyclops hyalinus* were the only species that were found infected under natural conditions. The larvae have been observed to undergo two definite moults, both under experimental as well as under natural conditions (Moorthy 1938) the second moult starting invariably before the exuviae of the first moult are cast. The larvae undergo the first moult between the 5th and 7th day (Fig 7) and the second moult between the 8th and 12th day (Fig 8) after the infection of the cyclops in hot weather (90 to 102°) and in cooler weather (55 to 70°) F the corresponding moults have been observed to take place respectively between the 8th and 12th day and between the 13th and 16th day after infection. Beyond a slight increase in size which takes place for about a week after it casts the exuviae of the second moult, (Fig 9) the larvae do not undergo any further development until they are swallowed with the cyclops by a suitable vertebrate host. When introduced into the definitive host, the cyclops are killed and the activated larvae are set free either in the stomach by the action of the hydrochloric acid in the gastric juice or in the small intestines by the action of bile (Figs 10 & 11), (Moorthy 1935). The larvae then reach the deep connective tissues possibly by direct invasion of the tissues of the stomach or intestines at a period much earlier than 67 days after infection. The presence of early developmental stages of the worm in the left ventricle in one of the infected dogs (Moorthy & Sweet 1936 a), the wide distributions of the worms throughout the tissues of the experimental dogs (in some instances in periods as short as 67 days), the inability of the third stage larvae to survive in gastric juice for more than a few hours and their survival for considerably longer period

in the blood serum, (Moorthy & Sweet 1938) suggest however the probability that at least a few of the larvae might enter the blood or lymph system before becoming finally established in the tissues. So far all efforts to induce *Guinea-worm* infection in experimental animals by introducing the third stage larvae released from the cyclops as well as by treating the cyclops with gastric juice directly into the blood stream by intravenous injection have not been successful. It has not yet become possible to obtain the stages of the parasite undergoing the third and fourth moult. Since these moults had occurred in the stages of the parasite obtained 67 days after infection in the experimental animals, it is presumed that these moults take place before this period, the larvae possibly undergo the third moult while invading the tissues of the stomach or intestines and the fourth moult when they become established in the deep connective tissues. Fertilization of the female takes place by the males in the deep connective tissues about 2 to 3 months after infection (Moorthy & Sweet 1938). Issajev (1934) has observed that the females, obtained from the experimental dogs, 183 days after infection were filled with eggs, those obtained 260 days after infection contained both eggs and motile larvae, and the others obtained 291 days after infection had only mature-actively motile larvae in them. As stated before, Issajev (1934) did not obtain stages of females earlier than 183 days after infection. The writer has observed that the females obtained from his experimental animals from 67 days upto 144 days after infection did not contain any eggs. It, therefore, seems probable, as judged from the available experimental evidence, that egg formation takes place between 144 and 183 days after infection, embryonation of eggs starts at about 260 days and is possibly completed by 291 days after infection, the females at this stage containing only very actively motile larvae in their uteri. It appears probable also that it is only the fertilized females which contain mature embryos in their uteri that migrate into the subcutaneous tissues at periods varying from 9 to 12 months after infection.

When the adult female is ready to discharge the larvae, it appears to inject a toxin into the skin of the host. As the result of this a local blister is formed, which, on opening, helps the worms to come out of the tissues whenever they are in contact with water and liberate the larvae. These larvae are swallowed by cyclops present in the fresh water and the life cycle starts again.

The females if not fertilized do not seem to undergo any further development and possibly become degenerated and are absorbed in the tissues. Similarly the males after fertilising the females also appear to degenerate and become absorbed in the tissues, calcification of worms occurring but rarely.

Discussion—It is of interest to note that in one of the experimental dogs that had been fed with infected cyclops, the first adult mature worm

appeared in the left hind leg (Fig 1-a) the animal presenting then practically the same signs and symptoms that are commonly noticed in human beings, i.e., restlessness, fever and the appearance of a small local blister (Moorthy & Sweet 1938) Manson Bahr (1935) explained the appearance of the *Guinea-worm* more often in the leg than in any other part of the body on the basis of the natural law of the propagation and the preservation of the species, i.e., that "the mature guinea worm conformably to her instinct, seeks out that part of the body most in contact with water" so that it may have a chance to lodge its larvae into water containing the intermediate host. This explanation may be all right so far as human beings are concerned, since in them the leg undoubtedly comes in contact with water most often. But it still remains to be explained why the worm selected the same part of the body even in the case of an experimental dog kept in a cage in the laboratory throughout the course of the experiment.

As reported already when once the infective stage of the larvae is introduced into the stomach of the definitive host and the larvae leave the gastro-intestinal tract, they seem to be capable of invading any connective tissue in the body. In this respect the finding of an immature *Guinea-worm* lodged in the meninges of one of the experimental animals, giving rise to epileptiform seizures and in another of an adult *Guinea-worm* in the orbital cavity producing partial blindness, appear to be of some significance. It is suggested that in areas where dracontiasis is endemic similar aberrant migration of the worms might take place in human beings also, giving rise to similar symptoms. In such areas it would probably be desirable to think of this as a possible etiological factor when no other satisfactory etiological factor can account for epilepsy, obscure nervous disorders, or partial blindness, noticed.

From the above account of the life history of *Dracunculus medinensis* it is observed that it has been possible to obtain fairly definite experimental evidence in the life history of this parasite so far as its development in the intermediate host is concerned, but in the definitive host it has become possible so far, to get some experimental evidence only from the time when the parasite reaches the connective tissues till it finally emerges out of an opening it makes in the skin. The important gap in the life history of the parasite, i.e., as to what happens to the infective larvae when they are released from cyclops in the stomach or intestines and how they reach the connective tissues, whether by direct invasion of the tissues or whether they become distributed in the tissues through the blood or lymph channel, it has not yet become possible to establish. The observation that immature worms as early as 67 days after infection were found practically in all the different connective tissues of the body including the deep subcutaneous tissues of the legs, abdominal wall, chest wall, etc., suggest that the parasite reaches the connective tissues at a period possibly much earlier than 67 days after infection.

and it seems very probable that fertilization maturation and embryonation take place when worms are lodged in the deep connective tissues and that the females migrate from the deeper to the subcutaneous tissues only when they are fully mature and are ready to lodge the larvae in the water. This view is also supported by the common clinical observation that in dracontiasis no recognisable constitutional disorders are noticed for nearly a year after infection and until the fully mature female worm tries to come out of the tissues and deposit the larvae in the water.

Summary

In this paper a brief outline is given of the possible life history of *Dracunculus medinensis* based on the experimental evidence gathered by inducing infection in a series of dogs. For the outbreak of *Dracunculus* infection in any place the presence of early cases of dracontiasis in the blister stage and a source of drinking water like a step-well, pond or a tank containing the infective species of cyclops, are considered to be essential. The first stage larvae on gaining entrance into the body cavity of cyclops have been observed to undergo two definite moults, the exuviae of the second moult appearing invariably before the exuviae of the first moult are cast. It is said that when these infected cyclops are swallowed by a suitable definitive host the third stage larvae are liberated from the cyclops either in the stomach by the action of the gastric juice or in the intestines by the action of the bile. It has not yet become possible to obtain experimental evidence to show how the larvae become lodged in the deep connective tissues whether by direct invasion of the tissues of the stomach or of the intestines or through the blood or lymph channels. It is suggested that the third moult of the larvae takes place while invading the tissues of the gastro-intestinal tract and the fourth moult after the larvae become established in the deep connective tissues, these two moults occurring much earlier than 67 days after infection of the definitive host. Fertilization, maturation, egg formation and embryonation take place when the female resides in the deep connective tissues, fertilization occurring 60 to 90 days, egg formation between 144 and 183 days, and embryonation of eggs between 260 and 291 days after infection of the definitive host. It is also suggested that only the fertilized fully mature female migrates into subcutaneous tissue and tries to liberate the larvae through the skin after the formation of a blister, the unfertilized females and the males after fertilization, undergoing degeneration and being mostly absorbed in the tissues, calcification occurring but rarely. The possibility of *Dracunculus* infection being responsible in endemic areas for partial blindness, epilepsy or obscure nervous disorders, due to aberrant migration of the worm in the earlier stages of its development into the orbital cavity or into the meninges, is also suggested on the basis of the observations made on experimental animals.

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GUINEA-WORM CYST—A CASE REPORT

BY

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The patient, a boy aged about twelve years, was a permanent resident in an endemic village for dracontiasis in the Chitaldrug District in the Mysore State, South India. When the village was visited in 1934 for an epidemiological survey of dracontiasis the patient presented himself for treatment. Out of fourteen people living in the family, it was only this boy who was getting guinea-worm infection frequently, although all of them were using water from the same infected step-well continuously for several decades together.

The patient gave a history of having suffered from very severe guinea-worm infection with septic complications, for the first time, in the year 1929, when the degenerated worm was extracted in bits with great difficulty. He was all right till 1931, when he noticed a small swelling of the

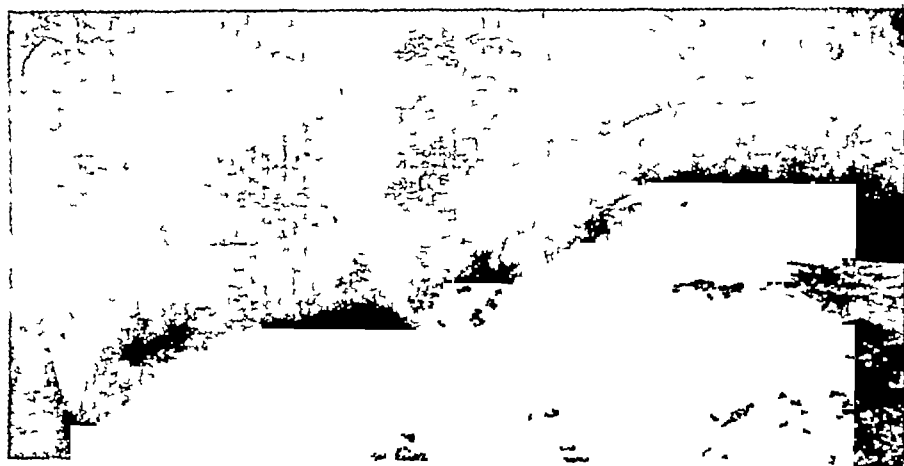


Fig 2 Guinea-Worm Cyst-Left Leg

size of a lemon on the left leg below the popliteal region. It later gradually increased to the size of a big coconut till 1933, and at the time of examination in 1934 it was of about the same size, slightly movable from side to side, cystic to the feel and the skin not adherent to the swelling but ulcerating in some areas (Fig 2). The swelling was not pulsating and on auscultation no bruit was heard.

With the history of previous guinea-worm infection and of continued residence in an endemic area for dracontiasis, a provisional diagnosis of guinea-worm cyst was made. This diagnosis was subsequently confirmed.

by aseptically aspirating a small quantity of the cyst fluid, centrifugalising it and finding dead and partially calcified *Dracunculus* larvae in the deposit. The cyst was then removed *en masse* under local anaesthesia. The post-operative course was uneventful except for slight generalised toxæmia with fever, persisting vomiting and urticarial rash all over the body during the first two days after the operation, these symptoms being considerably relieved by the usual treatment with adrenaline and calcium injections. This complication was possibly due to the slight accidental escape of the cyst fluid into the operated area during the operation.

On opening the cyst it was observed, that the guinea-worm that had been partially calcified was lying inside a fibrous tunnel. Smears made from scrapings from the walls of the tunnel showed a marked predominance of the eosinophile leucocytes (82%). The percentage of eosinophiles in the blood before the operation, was 13% and it gradually came down to 3% about three months after the operation.

The patient had a fresh attack of guinea-worm infection in 1936. This time he came for treatment when the blister was just forming in the right ankle. Since the worm was lying deep in the tissues the blister was at first opened and by frequent spraying with ethyl chloride for four days the worm was made to empty its uterus of the embryos, as far as possible, and at the same time the worm was also partially extracted by the common method of gentle traction and winding. The entire worm was subsequently extracted surgically under local anaesthesia. The preliminary treatment with ethyl chloride spray, before complete extraction by surgical means is attempted, appears to obviate greatly the possible risks of inducing severe cellulites, toxæmia, etc., by the accidental snapping of the worm during extraction, more especially when the worm is situated in the deep tissues in regions like the ankle, the knee, etc., where surgical extraction of the worm is usually if not always very difficult.

The interesting features of this case are —

- (1) The unusually big size of the cyst,
- (2) The marked local eosinophilia in the cyst wall—82%—while the blood eosinophilia was only 13%,
- (3) The extremely toxic nature of the cyst fluid suggesting the care necessary to avoid the operated area from getting contaminated with it,
- (4) The patient being free from guinea-worm infection during the period when he had the cyst and its reappearance after the removal of the cyst suggesting the possibility that the presence of the guinea-worm in the tissues probably acts as a

deterrant against fresh infection, giving thus possibly in the human beings also, temporary infection immunity as observed in the case of some of the experimental dogs (Moorthy & Sweet 1938), and

- (5) The patient being the only member in the family getting guinea-worm infection frequently although the whole family was using water from the same infected step-well all through the year and that continuously for several decades together, this appears to be a very interesting epidemiological observation that awaits a satisfactory scientific explanation since several such instances have been observed not only in this village but in a number of other infected villages also (Moorthy 1932)

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FILARIAL PENIS—ITS VARIETIES AND TREATMENT

BY

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Surgical repair of the filarial penis has always baffled the ingenuity of surgeons in India and elsewhere when filariasis deforms the male external genital organs. The surgeons who have had occasion to work for a fairly long time in endemic areas and who have the chance of observing the various manifestations of filariasis of the male genitalia would recollect that involvement of the skin of the penis to the exclusion of that of the scrotum is never found and that the filarial deformity of the penis invariably accompanies what is popularly called a filarial scrotal tumour.

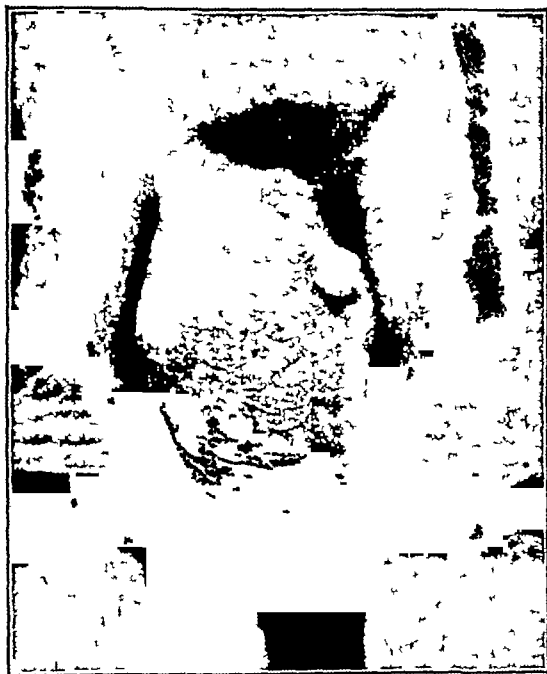


Fig 3 Penis not Embedded in a One-Sided huge Testicular Tumour



Fig 4 Penis Embedded in a left Scrotal Hernia

Varieties of filarial penis—My observations based on about twelve years of work in fairly endemic areas in the province of Bihar point to the fact that a filarial penis can only be found in the following three forms —

- 1 *Embedded penis*
- 2 *Straight hypertrophied penis*
- 3 *“Ram-horn” penis*

1 *Embedded penis*—Embedding can only occur when —

- (1) There is a pull on the ventral side of the penis (raphe and frenum) from both sides of the scrotum
- (2) The pubic skin is stretchable and supple enough to be pulled down and hang over
- (3) The skin of the penis itself is not badly affected nor thick enough to resist the dragging at the ventral side of the penis

It may be noted that all the above three factors get so combined to have an effective action that if any one of them is not operating invagination and the resulting embedding of the penis will not take place. Mere weight or size of a huge scrotal tumour has no such action. In a big one-sided scrotal tumour such as one caused by a testicular teratoma of one testicle the pull is not from both sides of the scrotum nor does the weight act on the pubic skin, the penis, therefore, does not get invaginated but lies on the top of the tumour (Fig 3). In a big scrotal hernia the pubic skin is so affected and scrotal skin so pulled on that the penis gets embedded (Fig 4).



Fig 5

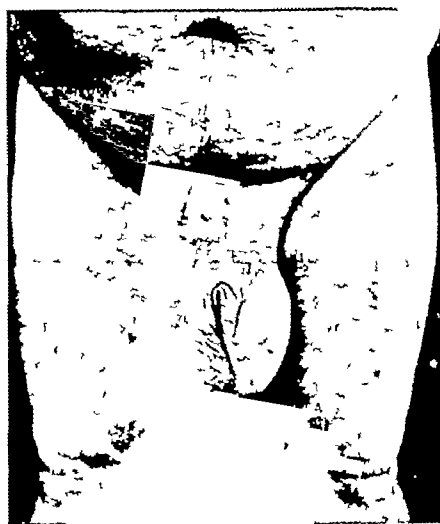


Fig 6

The various steps in the invagination of the skin of the penis in genital filariasis is well illustrated by Figs 5, 6 and 7. Fig 5 shows partial invagination with some protrusion of the penis, Fig 6 shows invagination of skin of the penis flush with that of the scrotum and Fig 7 shows complete invagination with a tunnel in the place of a protrusion on the scrotum. To bring the

penis out in such cases one has only to push at the scrotal raphe on the ventral side of the penis and it protrudes

Treatment of Embedded Penis—As different kinds of grafts on the denuded penis have all been tried and proved failures in the hands of various surgeons I do not denude the penis altogether I first liberate the penis by removing a rectangular piece of skin from the pubic region and dorsal side of the penis (Fig 8 abcd) I, then, proceed to remove the scrotal tumour forming a special bag for the testes. I do not place the testes under the skin



Fig. 7 Embedded Penis with a Tunnel on the Scrotum

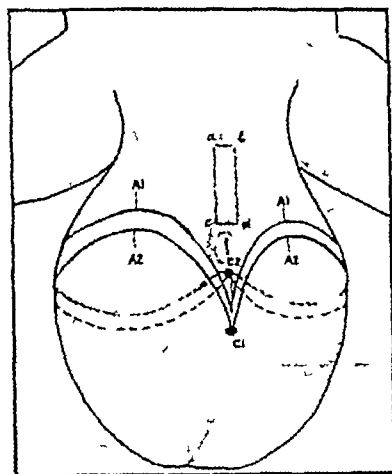


Fig 8 Lines of infiltration of Local analgesia and Incisions on Scrotum and Penile Portion (author's method)

of the groin The removal of the scrotal tumour at this stage is necessary as it relieves the tension on the ventral side and allows a correct estimate of the penile skin to be removed I, then, again turn to the penile portion of the operation, undermine the entire skin of the penis, remove the blubbery mass, save the important vessels and nerves, shape the skin flaps, remove the redundant skin and stitch the flaps up on the dorsum of the fully extended penis This leaves the skin of the penis smooth and to a great degree elastic Urination becomes normal but the erection of the penis is not as could be desired The results on the whole are better than when grafting is done which often leaves the penis as a stump-like structure firmly adherent to the pubic region with no elasticity whatsoever

2 *Straight hypertrophied penis*—This form of penis never gets embedded however great the size and the weight that the scrotal tumour may assume. In such cases the skin of the penis becomes hypertrophied and hard especially at the root of the penis and at the pubic region either before the skin of the scrotum hypertrophies to a great deal or simultaneously with it. The weight and pull at the ventral side of the penis do not cause invagination of the penile skin and hanging over of the skin of the pubic region. The organ, therefore, always lies on the top of the tumour. In such cases it is the prepuce which becomes eczematous and not the scrotum by the dribbling of urine.

Treatment—In this case it is not necessary to do the scrotal tumour first. I first do circumcision leaving out the stitching. I, then, make a vertical incision on the entire dorsum of the extended penis, undermine the skin flaps, remove the blubbery mass saving important vessels and nerves, shave the flaps, cut the redundant portion of the skin and stitch the flaps on the dorsum. The resulting scar is not hard or conspicuous.

3 *Ram-horn penis*—This form is rare and is always associated with a definite condition of the skin of the scrotal and pubic region. After some experience one, in the very initial stage of the condition, is able to say by the look of the scrotal and pubic skin that the penis would assume a ram-horn shape.

Fig 9 shows initial stages in the formation of ram-horn penis and Fig 10 a fully developed one.

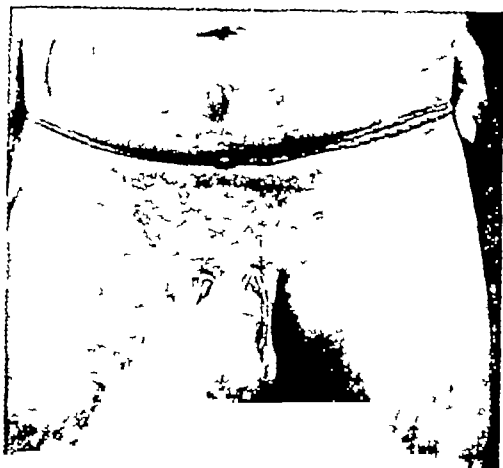


Fig 9

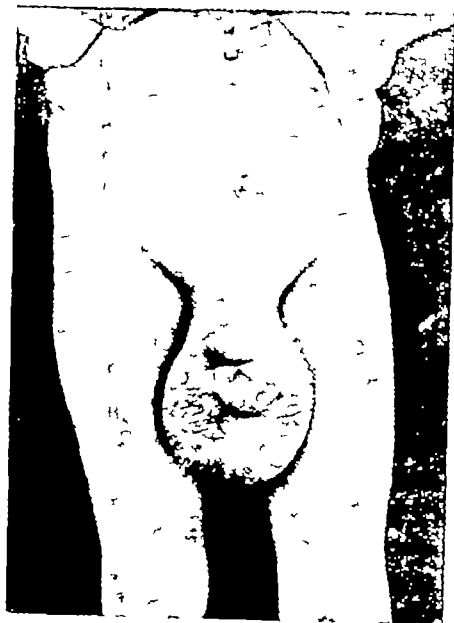


Fig 10

The skin in such cases is thick, dark, knobbed with lymph nodules and small lymphatic cysts. The big papillomatous areas and deep fissures do not usually exist. The external appearance is more like that of a dermatolysis than elephantiasis. The scrotal tumour does not assume a huge size. The skin of the pubic region is invariably involved and is found to be thick, hard, and hypertrophied up to the transverse interspinous abdominal fold.

Treatment—Removal of every bit of scrotal and penile skin and placing the testes under groin and skin-grafting the denuded penis serve no useful purpose as the pubic skin invariably gets very much hypertrophied in time after the operation and hangs as a big transverse fold from the abdomen on the genitals.

I, first, remove the scrotal tumour shaping the incisions in such a way that a bag for the testes is formed out of the thin perineal skin and some portion of the scrotal skin left on each side of the upper portion of the raphe. I then deal with the skin of the penis as described under straight hypertrophied penis. The only difference is that I invariably use an extension splint in such cases. After removal of the scrotal tumour, a vertical incision is made all along the length of the dorsum of the penis, the splint is then applied, two extension sutures (silk) are put in the glans near the corona and extension applied. The skin flaps are then adjusted and stitched on the thus fully extended penis (Fig 11).



Fig 11

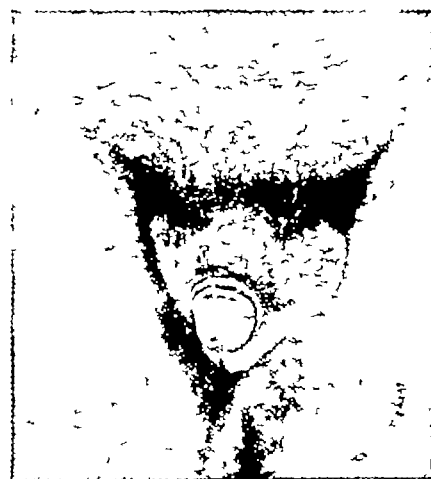


Fig 12

The extension is kept up all along till the wound heals. The extension sutures generally come off of themselves by cutting through in about 8 to

10 days The wound is dressed with gauze soaked in electro-chlorine lotion for 24 hours and after that, sterilized vaseline may be used It is noteworthy that inspite of the rough treatment that the penis gets by this procedure, retention of urine is not generally noted after the operation A catheter is not necessary and urination gets naturally established after 6 to 8 hours of the operation The results of my operation have so far been very encouraging (Fig 12)

Discussion—I find no advantage in removing every bit of affected scrotal and penile skin, placing the testes in the groin and skin-grating the denuded penis Complete removal of affected skin of the region may result in elephantiasis of the legs The testes in the groin being in an unnatural position get constantly pressed by flexion of the limbs and in time get atrophied Skin-grafting of the denuded penis has not yet proved satisfactory Theirsch graft leave the penis hard, inelastic and functionless Flap-grafts (Connell 1932) make it bulky and useless "Turned operation" and pedicle grafts met with failures in the hands of Cruickshank (1937) who devised a very convenient extension splint on the lines of Cabat splint and

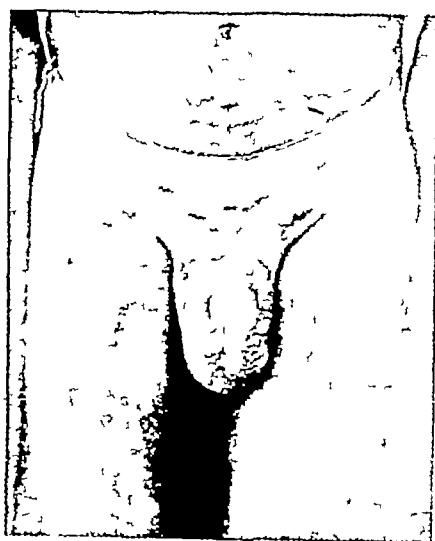


Fig 13

thought that the results should be good if the penis could be kept extended for the period sufficient for a graft 'to take' He did some cases but has not yet published the results The grafting is a tedious affair and does not prevent the skin of the pubic region and lower abdomen from hypertrophying and hanging over the penile region The method therefore has no advantage over the one that I use In fact the original skin of the penis when properly shaped serves the purpose splendidly and the functional results are better than those obtained through skin-grafting I was using an extension appa-

ratus devised on the lines of the external part of the Rowells' urethral electrode for diathermy of anterior urethra but for the last two years I am using a locally made splint of the Cruickshank type and find it very convenient and effective (Fig 12)

All cases of elephantoid penis are, however, not of filarial origin even in an endemic area. Generalized hyperplasia of penile skin in association with phimosis, simple lymphatic obstruction of the area due to any cause whatsoever and elephantoid condition of penis due to infection or trauma may, in time, all simulate filarial penis. The diagnosis is easy if the scrotal skin is safe and healthy because filarial penis without filarial scrotum, in my opinion, does not exist. Fig 13 illustrates elephantoid penis of non-filarial origin. A man of 48 years married a young girl. He wanted to prolong the erection of the penis during coitus. He slipped a metal ring on his flaccid penis. He achieved his object but the ring refused to come out. Painful priapism brought him to one of my colleagues. The ring was cut off and after some time he was advised to see me for the repair of his elephantoid condition of the penis. The details of the case without the photo were given in my article "Filariasis of the Male Genitalia" in the *Antiseptic* (1940).

I have to thank Dr F E R Laborda, the Chief Medical Officer, East Indian Railway, for the permission to get this note published.

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TREATMENT OF UN-UNITED FRACTURES*

BY

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The term un-united fracture practically includes non-union and mal-union. The difficulty arises regarding the treatment of these conditions because much difference of opinion has existed in establishing a definite routine. To my mind the basis of all scientific treatment is to remove the cause and as such I shall briefly mention below the various factors which are responsible for un-united fractures in different stages of treatment.

Elimination of Pre-operative Causes

(1) *Improper Reduction*—It is obvious that unless the broken fragments of bone are brought in proper alignment and immobilized they would unite in whatever position they are left over depending on the reparative activity of the patient's body. I am afraid the factor is not commonly appreciated as a very potent cause of un-united fractures. There are some who

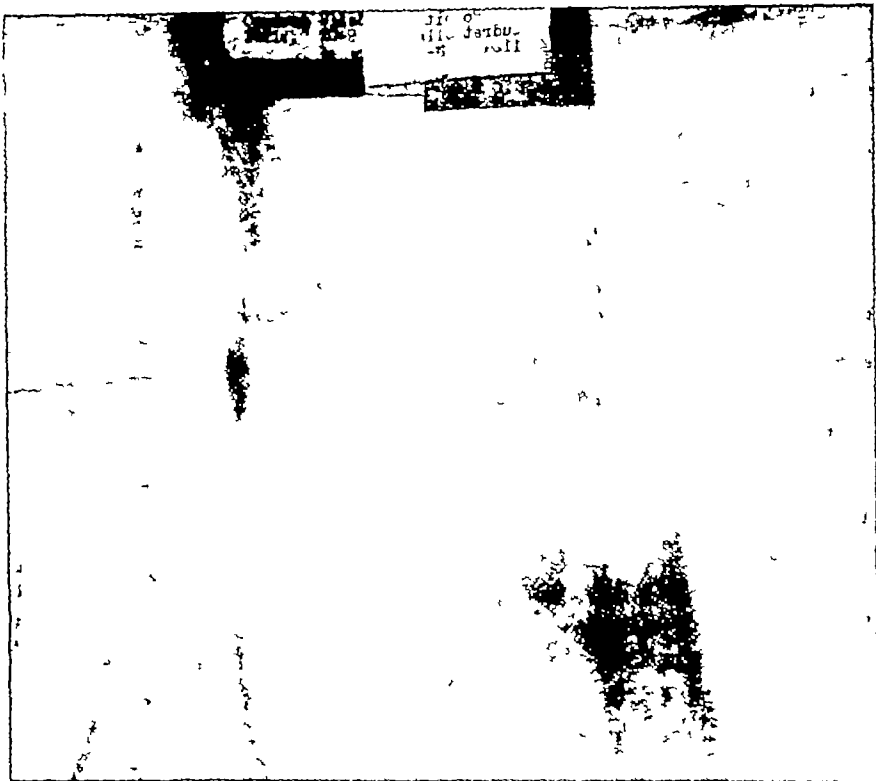


Fig 14 X-Ray photograph of patient referred to in text before and after operation

still cannot remove their mental association with the older theory that slight movement locally encourages union in bone and they often put forward the example of the rib. The recent work of Robert Sterling has shown that if good reduction is carried out after a fracture a "sealed off" chemical factory surrounds the ends of the broken bone. Anything which interferes with the reposition of the fractured bone, with the chemical activity in the factory, or with the lining encroaching walls of the factory will lead to delayed or non-union. If the reduction be done as soon as possible after the fracture and the position maintained by absolute local immobilization the traumatic inflammation and the mechanical displacement would have the best chances of cure.

(2) *Use of Improper Splints*—I have mentioned "Improper Splints" and not improper fixation because to my mind one great fallacy in the immobilization of fractures is the use of old wooden splints. I know of no splint which will not become loose in 24 hours' time and as such the surgeon is not doing his duty unless he examines the limb daily and takes the trouble of adjusting the splint every day. It is obvious how very difficult it is to do so and even if it is done the necessary shifting of fragments on re-adjustment cannot be avoided. I may therefore mention that we should emphasize the use of Plaster of Paris splints as absolutely essential in the treatment of fractures, and also as a prophylactic against non-union.

(3) *General Causes*

(i) *Syphilis*—No case of non-union should be treated without having the W.R. done. If positive, a course of anti-syphilitic treatment must precede the treatment of non-union itself.

(ii) *Old age, Kidney disease and Anaemia*—All these factors must be kept in mind before giving a prognosis. In a debilitated old gentleman, a fibrous union of fractured neck of the femur is probably all that can be expected or hoped for. Urine examination should be done as a routine and an effort made to raise the general resistance of the patient in every case.

(4) *Local Cause*—(i) Sepsis (ii) Interposition of soft parts

(i) Sepsis is by far the commonest cause of non-union or delayed union. A compound fracture is admitted on all hands to be one of the greatest tragedies to the patient. If there is non-union after an old compound fracture, the nature of the local infection must be ascertained in every case so that the patient may be immunised by sera or vaccines before any operative procedure is undertaken.

One clinical point of importance is to find out if the wound healed with or without severe constitutional symptoms and whether there

have been 'flares' or recurrences of infection since the primary healing of the wound. I think that at least six months must elapse before the patient can be tackled and even then a local test must be applied. I as a routine test the non-union cases by local massage and ray exposures for a fortnight, and see if any local flare up takes place. Unless and until this test has been applied there is no justification in undertaking an operative procedure.

(11) *Interposition of Soft Parts*—What greatly matters in this connexion is the interposition of Nerves. Before undertaking any procedure on a fracture, the clinical examination for nerve injury is absolutely essential. Attention to the nerves must have priority over bone or other structures for two main reasons—(a) Recovery after nerve suture takes longer than bone union and (b) it may not be possible to suture the nerve once bone union is established.

The interpretation of muscle is easy to remedy, at any rate on the operation table, and is not a common cause of trouble. Such factors as periosteum and tags of the capsules of the joints have been mentioned, the former in fractures and displaced Epiphysis of children, the latter in cases of fractured neck of the femur—I believe that none of these really matter as proper manipulation and immobilization will overcome any difficulty on these accounts. But if a nerve or a muscle is interposed the question of operative treatment is clearly in its favour.

Treatment Whether operation should be done

(1) Before undertaking any operation, one should take into consideration the condition of the limb. Every effort must be made to restore the muscle tone by massage and active exercises as the prognosis depends, to a large extent, on this valuable precaution.

(2) The basic principle of treatment involved in Orthopedics is whether the operative treatment undertaken will improve the function of the limb. Unless and until the usefulness of the limb is assured, or is likely no operation should be undertaken on anatomical grounds. I may mention here that in some cases it is better to leave non-union alone, *e g* —

(a) Non-union of the lower end of Ulna in cases with ankylosis of the Inferior Radio-ulnar joint, is of advantage to the patient and is the basis of Baldwin's operation.

(b) The occupation and the history of pain on performing the function are of importance in deciding whether operation be done—*e g* A patient could perform his usual duties with a suitable boot although he had a Fibrous union of the lower end of the tibia. Other common examples in this category are—(1) Fracture neck of the Femur in the very old (2) Fracture of the scaphoid with slight limitation of movement—I have

advised one of our medical students to leave the fracture alone (3) Fractures of the Epicondyles of the Humerus

(B) What type of operation is to be advised in Non-union cases

This entirely depends on the bone concerned But the operative procedure mainly resolves itself into two types —

(1) *Excision of the fractured fragment*—Common examples of these may be mentioned as Fracture Patella and olecranon I may mention here that I excised the fractured Patella in an old man 80 years of age under local anaesthesia and to our great satisfaction the patient got up on his limb and could walk with much greater confidence than before when he had a fibrous union and a gap of about $2\frac{1}{2}$ "—3" between the two patellar fragments It was really a very encouraging result

Other fractures, e.g., Wagstaff's fracture of internal malleolus, Fractures of the Epicondyles of the Humerus and the fracture of scaphoid and tips of spines may be mentioned as suitable for excision when all other treatments have failed and the patient still shows symptoms

(2) *Reconstructive operations and the method to do it*—My predilection to advise Bone grafting as superior to any other method is chiefly due to my training in the Guy's Hospital, London where first of all the plating operation of Lane took its origin There is much to discuss in this but I would mention here the operation of autogenous bone graft which I advise to my cases and the points in favour of it

Suffice it to say that the principle of using a foreign body on living human tissues is not a sound one as is borne out by the necrosis of bone and sepsis which often follow Lane's plating

The whole bone or massive autogenous graft method first described by Albee is the operation of choice It is the best means of filling in the gap in the bone and of encouraging the formation of new bone Here the periosteum, cortex and endosteum are all fitted into a gutter prepared in the fragments and the whole limb is then put in Plaster of Paris I think this method has many advantages over sub-periosteal bone grafts I shall describe here one of my cases —

Essentials are Orthopedic table X-Ray plates and asepsis

Anaesthesia General preferred to spinal —

History—Pt Q U aged 35 years, occupation farmer, admitted as a case of Malunited fracture Rt Femur, 8 months duration, caused by "bullock cart running over the patient" Thigh showed marked angulation, wasting of muscles and shortening of $3\frac{1}{2}$ "

Operation notes—Thigh exposed by incision an 1" below Superior Iliac spine to about 4" above the Patella, Sclerosed ends shaved, gutter cut, and the graft fitted in chip-grafts put around as the orthopedic table overcame the shortening Graft was removed from the same side Fibula and multiple holes drilled through it It was put in position and plaster of Paris was applied

After treatment and progress—No sepsis Stitches removed in 10 days

Anti-shock treatment—Intravenous saline, Glucose and Brandy

Post-operative complication and measures —

- (1) Stiff knee massage
- (2) Ulcer under the heel Healed up
- (3) Weakness of muscles of the leg were noted as post-operative complications but they disappeared with institution of proper treatment

I must acknowledge my thanks to my House-Surgeon, Dr A U Khan, M B , B S , for his splendid assistance during operation and his whole-hearted co-operation and intelligent Post-operative management of the case, without which the success would have been impossible

Post-operative Measures

The patient's limb should always be encased in Plaster of Paris immediately after the operation at the operation table This is the most efficient method of keeping the graft in position Windows are cut later on to dress the wound and remove stitches

Conclusions

- (1) To decide upon operative treatment of non-union, a thorough general examination of the patient is essential W R must be done as a routine
- (2) Local Sepsis or the risk of its flaring up must be obviated definitely before undertaking operation
- (3) The best reconstructive operation is to do a massive autogenous bone graft of the cortical inlay type on an orthopedic table
- (4) The limb should always be put in plaster of Paris as a Post-operative measure No splints must be used as far as possible
- (5) The results of the treatment advocated above are the best as compared to any other method

A NOTE ON FACIAL PARALYSIS

BY

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Paralysis of the facial nerve, whether partial or complete, results in some disfigurement of the face, for the muscles supplied by this nerve will be partially or completely put out of action following an injury or disease affecting it

The degree of deformity may vary from a slight alteration in expression to a truly hideous appearance, so that treatment is, in the main, directed towards the avoidance of extreme deformity or to its improvement once it has occurred. The etiology is disease, tumour or injury, and the condition may be cerebral or peripheral. It is to the latter type that interest and treatment is directed, as the cerebral type in which the lesion is above the nucleus in the pons, defies all efforts to effect cure or improvement. It is not within the scope of this short paper to deal exhaustively with the condition, but attention is directed to the methods of improving the permanent disfigurement left as a result of unilateral, complete facial paralysis (Bell's palsy)

When the paralysis is partial and temporary, resulting from inflammation and blows in the aural region, the prognosis is good, and recovery is the rule when the case is treated with simple orthodox methods. When the paralysis is complete the electrical reactions should always be determined, and if these are normal the prognosis is good, and the patient will get well or at any rate be partially cured.

However if the electrical reactions show an R D and especially when the latter has persisted for 6 months, the outlook is gloomy, and recovery of the nerve and its function are not to be expected. It is for these cases that some operative interference must be undertaken unless the patient elects to retain an asymmetrical face.

Nerve anastomosis is based on the effort to restore some voluntary action to the paralysed muscles, to this end the distal portion of the facial nerve is anastomosed with the trunk of the spinal accessory or hypo-glossal nerves. It is no easy matter to decide which of these nerves should be utilised, as there are advantages and disadvantages connected with both. It is easier to get at the spinal accessory nerve, but the movements of the face which accompany those of the shoulder may be highly inconvenient, and it is extremely difficult to disassociate the combination of these movements. The hypo-glossal is more difficult of access, and if completely divided there is paralysis of the tongue on the side of the lesion, but it is easier to re-educate the patient's facial muscles, as the nucleus of this nerve, is closer to that of

the facial nerve than that of the spinal accessory, and the functions of the facial and hypo-glossal nerves are more closely allied

On the whole, the results of using either nerve are good, and the operation should be persisted in providing the patient is of the right type, *i.e.* one who will co-operate, and endure the period of discomfort caused by the fixation of his neck in the position of greatest relaxation while the nerve graft is "taking", for any tension will prevent this. Many patients have not the temperament to go through this very uncomfortable period of inaction, and the writer has seen more than one promising case have its chance of a good result ruined by impatience and/or hysteria

The case described below was such a one. The patient was a highly strung, nervous youth who already had had a long illness, and who could not possibly have endured the fixation period necessary for a successful nerve anastomosis. The writer therefore performed the operation described in No 2 case sheet with a good result. He has never seen or read of any account of such an operation, but no doubt it has been performed before. It is purely a cosmetic one, and of course does not result in any restoration of nerve function *

Case Sheet No 1

Name—Mr B *Age*—20 *Sex*—Male, Single

Date of admission—16-6-1934 *Race and Religion*—A I C of E

Occupation—Student

Previous illnesses—Tonsillitis (1921), Enteric, Measles (1929), Influenza (1926), Mumps (1931).

Family History—Father died of haemorrhage after sunstroke. Mother alive. Four brothers and four sisters.

Smokes about five cigarettes a day. Does not drink.

Present condition—Patient has been troubled with his ear for four years. Starts with pain from behind the right ear (mastoid area), and works downwards to the angle of the jaw. Small pieces of "flesh" seem to appear, and a discharge comes from the ear containing "thickish pus," blood, and also sometimes a "watery fluid." The pain is severe enough to keep the patient awake all night, and also hurts during mastication. The ear is chiefly troublesome during the monsoons, (June to September) and does not worry him during the winter. The mastoid (right) is exceedingly tender to the touch. "Tapping" of mastoid with finger tip is painful. Has a glandular swelling in neck. The ear seems to have been neglected. There is moist discharge at present. Both ears have been affected in a similar way. His teeth are fairly good, tongue clean, appetite and digestion appear normal. No abdominal tenderness. Liver and spleen normal.

*28th October, 1941. Since writing the above an article by Mr Hamilton Bailey has appeared in the *British Journal of Surgery*, January 1941, page 341, where a similar operation is described, following the technique of Lodge.

- 18— 6—34 Treated with H_2O_2 , glycerine and carbolic drops Condition the same Still painful To be X-Rayed
- 20— 6—34 The mastoid appeared normal in the X-Ray, but there is some sclerosis around the External Auditory Meatus The condition is not responding to treatment As there is no improvement in condition and patient is restless, operation is thought advisable as early as possible
- 25— 6—34 *Anaesthesia*—Avertin, followed by open ether Usual post aural incision The whole of the right mastoid down to tip was found diseased Pus present All cells cleaned out, Aditus opened and Stacke's guide inserted Mastoid and Tympanic cavities made into one Malleus and Incus were free in Tympanum Lifted out and removed Stapes was left intact Extensive disease in Tympanum had completely destroyed the membrane Diseased tissue removed carefully, with gentle scrapping and gauze swab Whole of Aq Fallopius destroyed by disease and facial nerve was lying free in Tympanum, and was therefore unavoidably completely destroyed at operation
- 27— 6—34 Wound still painful but easier There is slight viscid discharge from ear Temperature normal Patient has a right sided facial paralysis which is only to be expected Feeling better Lead lotion and Carbolic drops
- 27— 7—34 Progress continues Patient up and about

Case Sheet No 2

Mr B, re-admitted to Hospital on 24-8-35

Patient was in Hospital from 16-6-34 Operated for Right Mastoid

Present condition—Still complains of pain in right ear with slight discharge Now has slight pain in left ear behind and over mastoid area No discharge Temperature normal No swelling Tender on tapping and pressing right side Otherwise patient is fit Electrical reaction RD on right side

- 28— 8—35 Still slight discharge from right side "Cold Ray" examination shows slight area not quite healed Treated with H_2O_2 drops and mercurochrome 1% drops Left ear quite normal, nil abnormal seen with lamp Temperature normal Up and about, full diet, comfortable
- 8— 9—35 Better No pain "Facial expression" the same
- 9—10—35 Some improvement in facial condition (not so much droop of lip on right side) Slight discharge from ear H_2O_2 and Iodoform powder

- 14—10—35 Temperature normal To be operated with fascia grafting
- 16—10—35 Operated upon under open Ether Arched incision over right temporal area Temporal fascia separated and sinus forceps inserted to reach tissue at angle of mouth, the MM over which was incised from inside the mouth A small piece of Fascia Lata was excised and attached to the tissue of the angle of the mouth through oral incision The other end was drawn up tight and attached to temporal fascia and wound closed after packing with Iodoform Gauze Another strip was attached from temporal fascia to under surface of eye brow
- 8—12—35 Doing well Very slight discharge from right ear Up and about
- 1— 1—36 R D of muscle supplied by Right Facial nerve Very slight moisture now from ear Discharged To continue local treatment at home

Extract from letter from Mr B , dated 17th Feb , 1937

Dear Col Murray,

I am very satisfied about my face and specially at the success of the operation My eyebrows have lifted four times within the last fortnight and I can whistle now quite well I am positive that my face will come back to normal soon

Yours truly,

(Signed) B

Shortly after this the patient came to see me, and to show himself to the staff of the hospital He himself was enthusiastic over the result of the operation, and I was also naturally very pleased at the cosmetic result achieved

In spite of what he had written in his letter of February 1937, the patient had of course no voluntary control over the muscles of his face, as the seventh nerve was destroyed He could however "stiffen" his face to some extent, probably by voluntary contraction of the muscles of mastication, combined with the splinting action of the fascial grafts, which enabled him to whistle, and to wrinkle his forehead

It was the improvement in the patient's appearance which was striking, and though the injury to the facial nerve at the first operation had left him with an inert, flabby and expressionless countenance, the second series of photographs present a very different state of affairs (Fig 16) The whole face is now alert, the patient has educated his temporal muscle to help in closing his eye, and his masseter to aid him to whistle I have seen Mr B ,

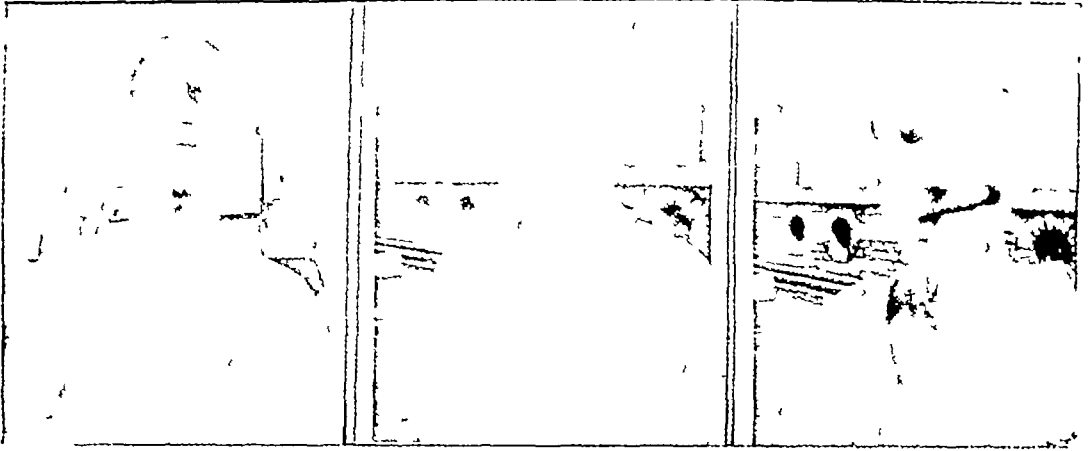


Fig 15 Photographs of patient before operation



Fig -16 Photographs of patient after operation

again during the last few months, and I am glad to say that the condition of his face remains as seen in the second lot of photographs

In this one instance, this operation has been a distinct success, so it would appear that a purely plastic operation has its place in the settlement of a deformity due to Bell's palsy, even though no restoration of voluntary function can be hoped for

It should be emphasised however that when a nerve anastomosis can be performed and voluntary movement restored it should be done, and the plastic operation described reserved for those special cases in which the nerve anastomosis is contra-indicated

(28th October, 1941) It is very interesting, at any rate to the author, that the above contains the same opinion as that paragraph which Mr Hamilton Bailey has written in January 1941, when describing the effect of Lodge's operation on his cases

A CASE OF ACUTE APPENDICITIS OF THE OBSTRUCTIVE TYPE WITH AN UNUSUALLY LARGE STONE

BY

S K SEN, FRCSE,

HON SURGEON, IRWIN HOSPITAL, NEW DELHI

Case Report—The patient, K F R, an Anglo-Indian female, aged 38 years, was admitted to my ward on 17-6-41 with acute pain in the abdomen, fever and a history of vomiting

History of the present illness—On 13-6-41, the patient had a severe attack of pain in the epigastrium which subsided, after a couple of vomits, within 2 hours. After an interval of 12 hours she again experienced the same kind of pain in the epigastrium travelling as far as the umbilical region. She recovered, apparently, after a few hours.

On 15-6-41, she again had a severe pain which slowly became localised in the right iliac fossa. Her temperature gradually rose to 103° and her pulse rate to 132, while she vomited almost every half an hour.

She gave no history of having experienced any similar attacks previous to 13-6-41.



Fig 17 Photograph of appendix and the stone

On examination the patient had a toxic appearance, a dry and coated tongue, pulse rate 142, and temperature 103.6° . She vomited once during the examination. There was marked rigidity in the right iliac fossa and slight rigidity in the left iliac fossa. No mass could be palpated. On auscultation there was evidence of excessive peristalsis all over the abdomen except in the right iliac fossa where no peristalsis was audible.

An immediate operation was decided upon. In the anaesthesia room the patient suddenly noticed a complete disappearance of pain. At the same time the rigidity disappeared but the pulse became imperceptible and a diagnosis of perforation was arrived at.

The operation was carried out under ether and oxygen supplemented with local infiltration.

The abdomen was opened by a right para-median incision and the appendix was found to have burst at the anti-mesenteric border near its base and the stone was extruding through the perforation. There was a collection of pus and sero-sanguineous material in the free peritoneal cavity which the omentum was tending to localise.

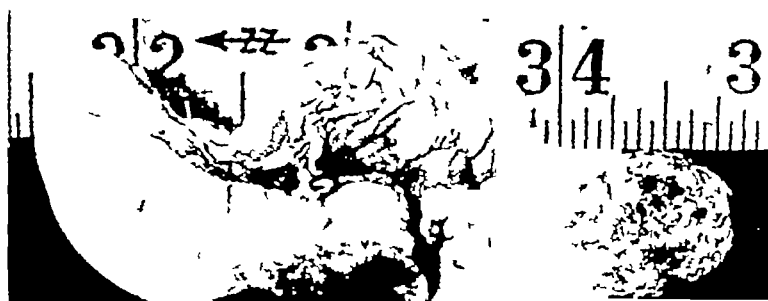


Fig 18 Photograph of appendix and the stone

Appendicectomy was done without invagination and the abdomen closed in layers after putting 50 ccs anti-peritonitis serum in the peritoneal cavity.

On culture the pus showed *B. Coli* and *Streptococcus Faecalis*.

Post-operative—The patient was put on continuous intra-venous saline drip, 10% soluseptasine 10 ccs 4 hourly and acetylcholine 4 hourly. Omnopon was given at night. On the second day acetylcholine was given 8 hourly and on the fourth day, soluseptasine and acetylcholine were discontinued and the patient was given oral sulphonamide 2 tablets t d s in all 24 tablets being given. The stitches were removed on the eighth day and the patient's temperature settled down on 1-7-41.

She was discharged cured on 12-7-41.

The stone was $\frac{5}{8}$ " by $\frac{1}{8}$ " in size, 4.18 grammes in weight, 3.32 ccs in volume and 1.27 specific gravity.

Discussion—During my four years' experience in the Irwin Hospital, Delhi, I have observed that at least 80% of all acute appendicitis cases that were admitted to my ward were of the obstructive type

During the last two years I have been conducting a series of observations, both clinical and experimental, by which I hope to develop the hypothesis that all acute appendicitis cases are essentially closed-loop obstructions in the first instance caused either by a band, faecolith, or constriction or obstruction of any other nature

My object in reporting this case lies in the fact that this is the largest stone I have so far seen in an appendix. Neither have I found any reports of such a large stone

The stone was probably formed in the appendix itself because, clinically, radiologically, and at operation the patient was found to have a normal gall-bladder

Visits to Clinics

VIENNA

BY

LT-COL K G PANDALAI, F R C S, I M S (RETD)

Vienna—Early in August, 1938, I happened to visit this famous city which for many years had been the Mecca of Medical men from all parts of India. Many Indians finished their Medical education with a few weeks here, others spent longer periods in the study of special branches of Medicine and many whose indifferent primary qualifications prevented their obtaining higher training in Indian or British Universities went to Vienna as here no ban existed on any one studying anything on account of lack of preliminary qualifications. A steady stream of Indian patients, particularly the wealthier classes came here for specialist treatment for which India provided no facilities, this stream, as the years went by, grew still further with improvement in the means of transport—faster steamships and Air travel. Also here flourished a branch of the American Medical Association, which opened its doors to all who came here for post-Graduate study and had developed into a social centre for visitors from the English-speaking world. The youth of India is now in a state of active development and are to be found in most parts of the globe and when I visited the place, I generally found more Indians in the rooms of the American Medical Association than other nationalities. I thus made many contacts, mostly with students of Medicine, through whose courtesy to a countryman, I was able to see much interesting work in the city.

As a Surgeon I was naturally more interested in Surgical work than anything else and devoted the short time at my disposal exclusively to seeing the best Surgical work possible. I thus had the good fortune to see the work of Prof Finsterer at close quarters. Prof Finsterer, as a Surgeon, is known all over the world and has a short and agile figure, age about 60 walks with a slight stoop, has an active manner, is friendly to strangers and speaks English and French fluently. He works at the Allgemeine Krankenhaus and has charge of about 100 beds on the ground floor, to the left of the main entrance from Alserstrasse. His operation Theatre was a modest affair and consisted of two small rooms on the ground floor separated by a centrally situated wash-up and sterilising room. His wash-up is a slow and elaborate affair and while scrubbing the hands with soap and nail brush, he and his assistants are seated on stools provided so that they may scrub their hands thoroughly and in comfort. I have not seen any other Surgeon spend so

much time with soap and nail brush as Finsterer. His sterilising equipment is a single unit fully enclosed all round in a polished steel sheet and of the height of an ordinary table, from which project on the sides, various handles and taps for removal of the required articles. His nursing staff are nuns, much as I saw in several clinics in America. Anaesthetists are mostly medical men or occasionally specially trained nursing Sisters, but here I saw the great majority of operations being done under local anaesthetic agents. The Surgeon himself injects the anaesthetic layer by layer as he proceeds, so that the anaesthetist has really little to do except in the rare cases where a supplementary general anaesthetic is required, when Ether or Nitrous Oxide and Oxygen are employed. Visitors are welcomed and being entirely free from formalities of every kind, soon feel quite at home. The Surgeon welcomes you, talks to you about the proposed operation and invites you to watch his cases from day to day and takes you along his wards.

Prof Finsterer as stated above uses local anaesthesia wherever possible and the continental patient seems eminently suited to the practice of Local Anaesthesia. Prof Finsterer is a great abdominal Surgeon and is slow and painstaking. He appears never to drop the operating knife during the progress of the operation as with it he is able to execute the most delicate dissection anywhere in the abdomen. His operations are long and take many hours. The longest one I watched was not over in 6 hours. It is remarkable how well the patients stand these long operations under local anaesthesia. The patient is generally so quiet and the Surgeon so pre-occupied that often the anaesthetist is able to go out during the course of an operation and attend to some other work and return to find everything going on as smoothly as before.

As a teacher, Finsterer is impressive and earnest and in his own hands his methods are remarkably successful.

No Medical visitor to Vienna will omit to visit the famous Bohler Clinic which by the originality and simplicity of its technique has revolutionised the treatment of bone injuries in recent times. This Clinic is situated in a 4 storied building of which the lower 2 floors are occupied by various Offices and only the topmost two floors are allotted for Hospital purposes. It is not well-known that Bohler's Clinic is maintained by a combine of Insurance Companies who find it cheaper to treat injuries well than pay compensation for inefficient or no treatment.

The aim of treatment here is to get the patient back to work and function as early as possible after injuries and with the easiest and cheapest technique. I had the opportunity of witnessing the special methods employed here for diverse conditions.

Generally the impression gained after a visit to the Institution is the outstanding efficiency of the staff, the studied ease with which work is

carried on without a hitch in spite of the comparative lack of affluence in the accommodation and equipment available

During the short time I was a visitor here, I did not see any signs of military activity and this is remarkable considering that the period of my visit was only a few months after the annexation of Austria by Germany. And it seemed surprising how readily the people had settled down to their new conditions in such a short time, but one could not fail to observe the various signs of the hard days the city was passing through. In the Allgemeine Krankenhaus, the building looked very old and the plaster was falling off in patches in many places and attempts appeared to have been made to effect minor repairs of a cursory kind. The Hospital was full, not a vacant bed was to be seen anywhere, but no patients were put on the floor as we see even in big Hospitals in India. Although the buildings and streets everywhere showed signs of age and neglected repair, there were no signs of flagging as far as quantity and quality of human effort were concerned. It is true that one did not see the magnificence of new Medical buildings visible everywhere in U.S.A., but men and women lived and worked as if they had never known want in any form or kind.

In Vienna, an Indian feels at home, as here a large student colony from India is always to be found as well as many Americans. English is spoken in most Hotels and food which appeals to Indian tastes is procurable. The result is that after a short sojourn, one leaves with a feeling of regret and hopes to come again.

We in India have always known that our well-to-do classes frequently went to Vienna for special treatment and returned in most cases greatly benefited. I therefore desired to see for myself the provision available for the treatment of such individuals and by the courtesy of a friend had occasion to visit a number of institutions catering for the wealthy sick of Vienna. In England such would be called 'Nursing Homes,' but here they are called 'Sanatoria' and it was remarkable how well equipped these were for the end in view. They were entirely free from the usual rigid atmosphere of Medical Institutions and although quiet prevailed everywhere looked more like luxuriously fitted modern Hotels than Hospitals. Facilities existed for treatment with light and X-Rays, baths of various kinds were provided, operation theatres furnished with the best of all equipment were ready and courteous trained attendants met you in each Department. Such Institutions add greatly to the attractions of a popular resort and accelerate the processes of repair of the body and the mind by providing congenial happy surroundings to the sick individual.

Association Notes

GOVERNING BODY

N C JOSHI (Delhi)	—President	
K G PANDALAI (Madras)		} Past Presidents (Ex-officio Members)
S R MOOLGAVKAR (Bombay)		
L M BANERJI (Calcutta)		
R N COOPER (Bombay)	—Vice-President	
C P V MENON (Madras)	—Secretary	
S K MENON (Madras)	—Treasurer	

MEMBERS

- 1 V R MIRAJKAR—Lahore
- 2 M G KINI—Madras
- 3 S SUBBA RAO—Bangalore
- 4 S R JOGLEKAR—Bombay
- 5 N MANGESH RAO—Madras
- 6 V L PARMAR—Bombay
- 7 H HYDER ALI KHAN—Hyderabad (Deccan)

The Fourth Annual Conference of the Association of Surgeons of India was held in the Medical College, Calcutta. The Local Secretary, Dr P Chatterjee and the Secretaries of the Association of Surgeons of Bengal had made excellent arrangements and there was an interesting programme of excursions and social engagements. An exhibition of Surgical instruments, appliances, etc, was also arranged in the grounds. The Session commenced with the Governing Body Meeting at 10 A.M. on 21-10-1941. 12 New Members who had been proposed were admitted. Questions regarding the Journal and the business for the General Body Meeting were discussed. The Meeting was adjourned to 3 P.M. on 23-10-1941.

At 11 A.M., Major General W C Paton, IMS, Surgeon-General with the Government of Bengal opened the Exhibition. The open Session was held in the spacious Medical College Hall which was tastefully decorated for the occasion. The Chairman of the Reception Committee, Lt-Col F J Anderson, IMS, introduced the President. Welcoming the delegates, he said —

Mr President, Ladies and Gentlemen, as Chairman of the Reception Committee I extend to our visitors to-day, The Association's of Surgeons of India, a warm welcome to this the second city of the British Empire.

It is appropriate that this Conference should meet in Calcutta since this is the earliest centre for Medical learning in India, and many Surgeons, whose names will long be remembered in the Surgical world, have been associated with the Medical College.

Unfortunately owing to His Excellency Sir John Herbert, the Governor of Bengal being absent from Calcutta, His Excellency has been unable to be present and open the proceedings to-day. His Excellency has extended his Patronage to the Meeting and wishes it every success.

At your last Conference at Delhi, this Province was not well represented, but you will see from the large attendance to-day, that the Surgeons of this Province feel the need of such Conferences. I feel certain that there will be a large increase in the Membership of the Association as the result of this week's Meeting.

I hope you will leave Calcutta with a happy recollection of a useful and pleasant holiday.

The following Members of the Association of Surgeons of India have sent messages of Good Will and wish the Conference every success —

Lt-Col F W White—Simla
 Dr Narasimha Aier—Madras
 Dr B N Sinha—Lucknow
 Dr R V Mone—Dharwar
 Dr Rajan—Trichinopoly
 Major A K Gupta—Razmak
 Lt-Col V R Mirajkar—Lahore
 Dr S S Anand—Lahore

The President, Dr L M Banerji, then delivered his Presidential Address —
 Ladies and Gentlemen,

In electing a President of your association you are conferring the highest honour and compliment to the member on whom your choice has fallen, and this honour is enhanced by the distinction of those who have preceded him in this high office. I would therefore ask you to allow me to express my deep appreciation of the honour you have done me by asking me to preside over your deliberations at this conference.

It is not possible for a President to address a distinguished body as is gathered together to-day, on subjects which will interest and appeal to every one and I only venture to place before you for your consideration some which have engaged my mind for some time and which I think relate to the aims and objects of an association in particular and to the interest of our profession in general.

The Secretary will give you a detailed report of our work during the past year and from it you will gather that though our association is in its infancy, it has gained a stature of no mean dimensions. Nearly every body in India who is interested in the practice of our art and science is a member of our association and we now form an authoritative body in our sphere of work.

We must congratulate ourselves we have rigidly confined ourselves to activities which concentrate purely on our aims and objects, viz, the advancement of our art and science unfettered by the turmoil which surround us and I have not the least doubt that we shall not in future deviate from the line we have marked out for ourselves. We are craftsmen in the truest sense of the term and our ideals rise far above those of a trade union. We stand firmly on those ideals with the bond of science uniting us in a manner that needs no protection. When we look back we are encouraged by the steady and rapid advance surgery has made in India. In a comparatively short space of time there has grown up a true scientific instinct in our increasing number of Surgeons who have the zeal, courage and capacity to undertake any surgical measure made possible to-day by improvement in technique and increase in knowledge. The bugbears of sepsis and shock have almost disappeared and this has opened larger fields for us to venture in with confidence. The mortality rate, which is the true index of success in surgical operations, has been lowered to a marked degree and compares favourably with any else-

where We have now the experience and knowledge to undertake the severest surgical measures with a reasonable margin of safety The numerical figures of our surgical operations are mounting rapidly and even alarmingly with the advent of an increasing number of skilled Surgeons This leads us to the question of the rapidly increasing incidence of certain pathological conditions which demand surgical measures for their treatment and which measures form mainly the bulk of the number of our surgical operations It is true that with the improved and accurate methods of investigation now at our disposal we are able to diagnose pathological conditions more correctly which was not possible before but at the same time it must be acknowledged that that is not the only explanation of this increasing incidences of the diseases in question Here we have a large field for investigation and research and we must not leave it neglected Those of us who are practising surgeons may not have the time at our disposal to carry out these investigations and this important work has to be organised by us for a body of men in whom there is a spirit for research But they must have the financial support which will free them from cares and I would commend to you the proposal of creating a Research Fund which will enable research workers to come forward to help us in our work It is easily conceivable that from small beginnings this Fund is bound to grow almost as soon as it has been started Thus it is not too soon that we realize that in this vast country of ours we should be in close and constant touch with each other to establish ourselves firmly in the spirit of co-operation aiming at our goal, the advancement of our science and art Our association is at present the only connecting link between us and though we meet only once a year, we have in our journal a most effective instrument which gives us the facility of this close contact among ourselves and in our work Time, distance and expense restrain our activities in this direction to a large extent but even then we should also make a sincere endeavour to meet one another periodically for mutual benefit and the cause of our Science

One of the points, and to my mind it is a very important one, I wish to stress relates to the teaching of medical students, a work on which most of us are engaged and on which depends the future of our profession For some time I have felt that the present day student has taken to do his work rather empirically and without that foundation which was a marked feature in former years, and I ascribe this to the unwise and unfortunate measure, introduced by those in authority, of divorcing the teaching of pre-medical sciences from the medical schools with the object of shortening the period of medical studies These subjects when originally introduced in the curriculum of medical studies were thought to be, and are still so thought by many, to be an introduction to medical science and more useful for the student to form and develop a scientific mind so necessary for the reception of medical knowledge later and it was also found that in order to get the best results these subjects should be taught in the medical schools where their importance and application to medical sciences could be better emphasised The economic conditions prevailing to-day has necessitated the changes I have mentioned though it is still demanded from the medical student that he should possess some knowledge in these subjects acquired elsewhere This matter requires revision of thought and outlook Then we have seen appear in recent times a tendency to make the pre-clinical subjects as anatomy and physiology more and more elementary Here we are treading on really dangerous grounds These subjects form the very foundation of our Science and on them are based all our clinical and operative work. The changes contemplated would be very unsound policy and will court disaster Again the present curriculum for the clinical subjects enjoins the student to spend a considerable time to acquire some knowledge in such subsidiary subjects as radiology, dermatology and a few others which are really specialized branches of general surgery The result is that he is over burdened with instruction on these separate subjects and finds the period of his hospital practice very much curtailed He seems to learn less and less of

more and more We have a duty to consider these problems seriously and to regulate the course of medical studies in such a manner that when the student has finished he possesses a sound knowledge of essential things which are necessary for his responsible vocation

This leads me to another point which has been engaging the attention of most of us and that is the development of a practical scheme for post-graduate studies I find that the conception of post-graduate studies is regarded by many of us as associated with a regular course of instruction on the lines of under-graduate teaching only somewhat more elaborate and which has mainly in view the preparation of graduates for higher academic qualifications To my mind the best form of acquiring post-graduate knowledge and experience would be during the period when the graduate is passing through his incumbency as house-surgeon, registrar and demonstrator and so on. He has then ample opportunities to find his feet, gather confidence and experience and devote his time to study untrammelled by the necessity and cares for earning his living You must agree that it is his own efforts in these directions which will shape his future and no amount of concentrated and intensive spoon-feeding can take its place It is here that the seniors have their important duty to help and guide the juniors to fit them for more responsible work as well as to enable them to satisfy their academic ambitions We must not confuse this form with the refresher course of instruction during which a practitioner wishes to spend a limited time periodically to brush up his knowledge and keep himself abreast of times It is incumbent on all medical institutions to provide and maintain these facilities especially for those who have passed through them

While we are considering some problems of medical education I am reminded of another suggestion made by my immediate predecessor in office that we should form ourselves into a body to maintain a high standard in our specialized profession The idea is to form a College of Surgeons with all its implications that it may hold tests and confer on those who have attained the required standard, the coveted distinction of its Fellowship It is high time we did so, for we have created a place for ourselves in the domains of surgery and it is right we should have an organization which will look after, maintain and safeguard our standard I would therefore commend to you the proposal that a small committee be appointed for this purpose of developing a practical scheme to be put before you for your approval in the very near future

We have now at our command powerful chemical and biological agents which have considerably improved our outlook in the treatment of virulent infections But there is still a great deal to be done towards improving on them For instance we have not yet discovered a 100% safe anaesthetic Here again we have a large field for research and we must do our very best to initiate and encourage this important branch of our science, through our association

During the last great War as also during the present one we have had and are now having the experience of being handicapped to a large extent from the inability to obtain supplies of material and equipment necessary for our work We have the beginnings of industries in these lines and it is to our interest that we encourage, foster and guide them to produce our requirements at a high grade of perfection

We have achieved much but much more remains and it is in the encouragement of our past achievements that we should unite our efforts in creating a tradition for Surgery in India

It now remains for me to express on behalf of our association and myself our great indebtedness to the Association of Surgeons in Bengal and to our local Secretary for having made such perfect arrangements for our Conference and the Reception Committee and its President for having welcomed us

Our activities confine us to the discussion of problems that face us in our professional work in order to clarify and enlarge our views on them. It has been a very happy and wise decision with us that we engage ourselves to consider only a small number of subjects that we may have our attention concentrated on them with profitable results and I hope that we shall continue this practice.

Prof S C Sinha proposed a vote of thanks to the President and to the Chairman of the Reception Committee.

The delegates were then entertained at a Lunch by the Association of Surgeons of Bengal at the Great Eastern Hotel. The afternoon was devoted to the discussion on "Surgical treatment of Pulmonary Tuberculosis" (detailed reports of this and other subjects discussed will be published in due course).

A group photograph was taken at 4-30 P M and after that the delegates were the guests of Dr K S Ray at a tea-party in the Medical College Grounds. At 6 P M, the Editorial Board of the "Indian Journal of Surgery" met and discussed matters relating to the Journal.

The same evening, there was a grand dinner at Firpo's Restaurant. Lt-Col Anderson and Lt-Col Denham White were the hosts.

22nd October, 1941. At 8-30 A M the delegates saw very interesting collections of Specimens in the Anatomical and Pathological museums. The rest of the morning was devoted to the discussion on Surgical Aspects of Filariasis. The afternoon was spent in a visit to the Bengal Chemical and Pharmaceutical Works, Ltd, at Panhati, where tea was also arranged by the Management.

At 8 P M the Annual Dinner of the Association was held at the Great Eastern Hotel. The Nawab and Begum of Dacca, Major-General W C Paton and a few others including a number of ladies were guests of the Association. At the conclusion of the Dinner, the President, Dr L M Banerji proposed the toast of the King. Dr R N Cooper, Vice-President, proposed the toast of the Association of Surgeons of India. Dr S R Moolgavkar replied. The Nawab of Dacca and Major-General W C Paton made short speeches wishing the Association, prosperity and increasing strength. Lt-Col K G Pandalar proposed the toast of the guests.

The next morning (23-10-1941), Lt-Col F J Anderson took the delegates round the Medical College Hospitals. The discussion on Surgery of the Thyroid followed. In the afternoon, the Carmichael Medical College was visited. The adjourned Governing Body Meeting was held there at 3 P M. The subjects for discussion at the General Body Meeting were considered and five more new Members were admitted. Preliminary steps were taken to publish a Text-book of Surgery, and to start the nucleus of a Central Reference Library.

The General Body Meeting followed —After the opening remarks by the President, the Secretary read the Annual Report —

This report covers a period of just over 6 months since the last Annual Meeting held at New Delhi in April, 1941. The Annual Meeting was a great success owing, largely to the efforts of Dr N C Joshie, the Local Secretary. The proceedings were reported in full and circulated to all the Members in September, 1941.

Membership—There are now 187 Members on the rolls including 5 New Members admitted since April, 1941 and 5 Associate Members. We regret to announce the death of one of our most energetic Associate Members Dr P Ramachandra Rao. And recently we have lost another Member in the death of Capt E. S. Gopalan, M S, of Coimbatore.

Finance—The balance to the credit of the Association including cash on hand and with Bankers amounts to Rs 3,979-2-9. In addition a sum of Rs 864 is due from Members as arrears of subscription. Steps are being taken to realise this, some of these Members are on Active Service and there may be some delay in realising their dues. The accounts of the Association have not been audited since it was done last December. This will be done in due course at the end of the year. The Imperial Bank of India continues to be the Bankers.

Prize Essay—The subject for this year's Prize Essay is "Infections of the Foot". It is hoped that the response this year will be better than that of last year.

The Journal continues to be published from the Central Office at Madras. Some difficulty is being experienced in the bringing out of the Journal on account of the fact that both the Editors are resident in Bombay. The practice of including detailed reports of the discussions at Annual Meetings has also led to delay in bringing out the Journal in time. It is proposed that in future only abstracts of such discussions be published, the Opener's paper being published in full. These and other questions will be discussed at the Meeting of the Editorial Board.

We were faced with a rather unpleasant situation when two of the three Surgeons who were to open discussions at this Meeting suddenly expressed their inability to present their papers. Rai Bahadur Dr G. D. Kapur and Lt-Col K. G. Pandalai, however, came to our rescue and, at very short notice, undertook to open discussions. I take this opportunity to express the deep gratitude of the Association and its Secretary for their timely help. It is hoped that such situations will not arise in future.

The President next moved a resolution of condolence on the untimely death of two of our members, Dr P. Ramachandra Rao and Capt E. S. Gopalan.

After some discussion, it was decided that February will be a better time for future Sessions of the Conference and it was decided that the next Meeting be held at Hyderabad in February, 1943. Dr Hyderali Khan proposed the name of Dr Munawar Ali for Local Secretary and he was duly elected.

"Surgery of the Gall Bladder" was chosen as a subject for discussion in 1943, in place of "Surgery of the Thyroid," which had to be taken up this year. The following subjects were selected for 1946:

- 1 Carcinoma of the cheek by Dr B. M. Joly
- 2 Tuberculous disease of the Spine by Dr S. P. Srivastava
- 3 Hare lip and Cleft Palate by Dr S. C. Sinha

Lt-Col K. G. Pandalai proposed that Dr N. C. Joshi of New Delhi be elected President for the next year. Dr R. N. Cooper seconded and he was unanimously elected.

On the recommendation of the Editorial Board it was decided that one of the Joint Editors should be from Madras. The President proposed that Dr C. P. V. Menon be elected in place of Dr V. L. Parmar as Joint-Editor and it was passed unanimously. The Secretary then proposed a vote of thanks to the Association of Surgeons of Bengal and to the Local Secretary, Dr Panchanan Chatterji, for the excellent way in which every arrangement was made for the success of the Conference.

The President, concluding the Session said —

Ladies and Gentlemen,

The labours of this Session having ended, we must now take stock of our deliberations. Three important subjects have been dealt with and our views of them are clearer in the light thrown on them by the experience of so many of us.

We have been convinced of the importance of the advantages of Surgical treatment of Pulmonary Tuberculosis at suitable stages of the disease when collapse of lung is indicated. Of the various methods at our disposal, the consensus of opinion is that Phrenic and intercostal nerve paralysis do not offer the same advantages as pneumonolysis and thoracoplasty. There was, until lately, a tendency to defer the operation of thoracoplasty till a later stage in view of the drastic nature of the operation and its resultant deformity and disability, and thus extrapleural and closed intrapleural pneumonolysis, with their less severe measures came to the fore. The fascinating possibilities of the latter have opened a new field and no doubt when further advances are made, it will be a popular means of attaining our object. Till then thoracoplasty will remain the most effective means of producing the desired collapse of the lung and we are also convinced that done in several stages and ensuring complete removal of the required number of ribs and cartilages leaving no paravertebral pleural gutter and anticipating and meeting successfully the complications that arise during the operation and during convalescence owing to our knowledge being advanced from experience, this operation can now be undertaken with confidence.

We have also listened to a number of experienced Surgeons on their views on Filariasis. The elusive causative organism respects no part of the human anatomy where lymphatics are present and besides causing intense mental distress and suffering, for obvious reasons, leaves by its depredations not only disabled victims, but also endanger their lives, when it marshalls to its side, its jackal friend, the virulent cocci. The various speakers have related their experience of the technique and results of their operative procedure for the relief of the lesions it has caused which offer new suggestions. But at the back of the minds of everyone of us, there is the consciousness that we do not yet possess any satisfactory agent which will finally drive out this detestable worm from the system of its victims. While we have at our disposal effective remedies for the treatment of Kala-azar, Malaria and Sphilis, we can certainly hope that intense research work will produce what we need.

Lastly, we have devoted considerable time to the instructive discussions on Thyroid Surgery. As a little digression, I wish to draw your attention to the fact that while we in former days used to spell the word thyroide as thyroid, we have now added to it an 'e' perhaps to make us feel we know more about it. Our main burden was the incidence and the Surgical treatment of Thyroid enlargement. We have discovered that while in certain areas, it is comparatively rare in others they occur in almost millions. But from the figures given by the speakers, the incidence of primary toxic goitre seems to be low everywhere in India. We had listened to the experience of a fair number of speakers whose total operative figures are weighty and they all agree that mortality figures are low when surgical measures are taken. The question of anaesthesia in non-toxic case does not seem to be important when one has basal local anaesthetic supplemented by others. We are all agreed that the treatment should be early and fairly complete in both toxic and non-toxic varieties. In toxic cases careful preparation of the patient previous to the operation yields happier results.

Lt-Col K. G. Pandalai, the first President of the Association proposed a hearty vote of thanks to the President, Dr L. M. Banerji and complimented him on the efficient way in which he conducted the deliberations. During his remarks he expressed a hope that the formation of an Association of Surgeons of Bengal would not divert the interests of the Surgeons of Bengal from the parent body.

After the General Body Meeting, the Dean of the Carmichael Medical College entertained the members to tea.

The last day of the Session was entirely devoted to visits to places of interest in and around Calcutta. A trip down the Hooghly to the Botanic gardens was arranged by Col Anderson. Lunch and tea were served on the Steamer and the delegates enjoyed a very pleasant afternoon.

SUBJECTS FOR DISCUSSION

5th Meeting, Feb. 1943

- 1 Laryngeal Carcinoma by Dr H D Gandhi and Dr S G Joshi, Bombay
- 2 Injuries of the Thorax by Dr C S Patel, Bombay
- 3 Surgery of the Gall Bladder

6th Meeting, 1944

- 1 Traumatic Surgery of the Skull by Dr R N Cooper, Bombay
- 2 Carcinoma of the Breast by Dr N C Joshi, Delhi
- 3 Urinary Lithiasis by Dr L B Joshi, Karachi

7th Meeting, 1945

- 1 Carcinoma of Rectum by Dr C P V Menon
- 2 Enlarged Prostate by Dr S R Moolgavkar
- 3 Fractures of the neck of the Femur by Dr B N Sinha

8th Meeting, 1946

- 1 Carcinoma of the Cheek by Dr B M Joly
- 2 Tuberculous disease of the Spine by Dr S P Sriyastava
- 3 Hare Lip and Cleft Palate by Dr S C Sinha

Association of Surgeons of India

PRIZE ESSAY ON "INFECTIONS OF THE FOOT"

The Association of Surgeons of India offers an annual prize of the value of Rs 150 to the best essay based on original work on a subject to be decided by the Governing Body of the Association and announced every year

The following are the conditions of the award —

1 The competition is open to all qualified medical practitioners registered in India, who have been in practice for not more than 10 years after qualification

2 The essay should be based on original work and should be written in English

3 It should be type-written on one side of the paper only and should not contain the name or other indication of the identity of the competitor Four copies should be submitted

4 The name, address and qualifications, however, should be written on a separate sheet of paper and enclosed with the essay

5 The subject for 1942 is "**Infections of the Foot**" and the essay should reach the Secretary before the 1st October 1942

6 The copyright for the winning essay will remain with the Association of Surgeons of India and will be published in the Indian Journal of Surgery Other essays will be returned to the senders if accompanied by stamped addressed envelopes

7 The Governing Body may at its discretion withhold the prize if the essays submitted do not come up to the standard

8 All communications regarding the above are to be addressed to the Secretary, Association of Surgeons of India, Binfield, Kilpauk, Madras

C P V MENON,

Hony Secretary

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